# THE THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE.

Whole Series, Vol. XXXIX. | DETROIT, MICH., SEPTEMBER 15, 1915. | Third Series, Vol. XXXI, No. 9.


## ORIGINAL COMMUNICATIONS.

### CONCERNING CERTAIN POST-OPERATIVE AND POST-TRAUMATIC OCULAR COMPLICATIONS AND THEIR TREATMENT.[1]


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MR. PRESIDENT AND GENTLEMEN OF THE NEW ENGLAND OPHTHALMOLOGICAL SOCIETY:

On your kind invitation I have the pleasure of addressing you this evening on certain complications which arise in the course of operative work and in connection with the management of injured eyes. Naturally, the observations which I shall relate and the treatments which were adopted are familiar to all ophthalmic surgeons, and I would not bring them to your attention were it not that occasionally some profit arises from the record of individual experience in its relation to work which is common to all of us.

I. *Concerning certain types of post-operative glaucoma.* That increased intraocular tension, and in this respect glaucoma, may follow various operations on the eyeball, particularly the extraction of cataract, is well known. For the moment I refer to that type of increased intraocular tension which follows delayed restoration of the anterior chamber and delayed healing, especially if anterior synechia result, or if there is adherence of one or both pillars of the coloboma to the cicatrix, or an adhesion of the lens capsule to the cornea. Delayed restoration of the anterior chamber is almost always, if not always, due to the inclusion of some foreign substance—lens capsule, a fragment of iris, or conjunctival tissue—between the lips of the wound, or healing may be tardy when the incision is finished in the corneal tissue, because the wound becomes slightly separated and a groove remains, closure proceeding very slowly and often complicated by the formation of anterior synechia. It is not necessary in this connection to discuss Derrick Vail's theory that one real cause of this condition of affairs is a spastic contraction of the orbicularis, which he believes can be cured by a tenotomy of the orbicularis muscle.

I cannot agree with the advice, so often recorded in text-books, that the eye shall be kept under a dressing until restoration of the anterior chamber takes place, but sympathize with that long ago given by Horner, later by Berry, and quite recently reiterated by Gifford, that if any dressing is applied, it should be of the lightest character and should exert no pressure on the lids, and that usually all bandages should be removed and the eye covered simply with protecting spectacles, preferably made of wire gauze. Naturally, any foreign substance must be removed, and it is not without benefit to look for what the late Dr. Trousseau used to call the almost imperceptible incurvation of the flap, and remedy it; nor is it without profit gently, after holocainization of the eye, to cauterize the entire length of the wound either with a finely-pointed pencil of silver nitrate or with carbolic acid.

In spite of such treatment, however, in a

[1] Paper read before the New England Ophthalmological Society, April 13, 1915.

certain number of instances the adhesions to which I have referred take place, and the point I wish to make is that they should be dealt with surgically, even in the absence of active symptoms or immediate rise of tension, because of the danger of glaucoma as a distant complication.

Five times in my personal experience I have encountered this complication, and more than once in consultation with other surgeons. The eye of one of these patients became blind because she did not report for months after the glaucomatous symptoms had developed; she left the hospital with excellent vision, but with a slight incarceration of one pillar of the coloboma. In another patient the attack began some months after the operation, which had resulted in practically normal vision; there was only a small entanglement of one pillar of the coloboma. This eye was cured by the instillation of eserine, as was also one other similarly affected eye under like conditions, in a third patient.

To the two remaining patients I wish to refer somewhat more in detail. From the eye of one of them, a man only thirty-nine years old, a cataract was extracted after preliminary iridectomy. The anterior chamber was not restored until the expiration of six weeks—the longest period of delay in this respect I have ever encountered, in spite of the usual procedures—release of the eye from bandage, careful inspection of the wound for foreign body, and one light cauterization with nitrate of silver. So small was the incarceration of the iris, simply a little strand running up from the outward pillar of the coloboma, that it did not seem worth while to interfere, especially as the patient had normal vision with glasses. A few weeks after their adjustment a slight pain in his forehead caused him to report for examination. Externally the eye exhibited no redness, but palpation of the globe indicated that the tension of the eye was higher than normal, and yet the vision was not materially reduced, being still 6/7.5, and the field of vision was full. Loupe examination, however, detected a very faint stippling of the upper portion of the cornea, and the tonometer registered a tension of 44¾ mm. After a few days of myotic treatment the patient was urged to permit operative interference. Three procedures suggested themselves: division of the anterior synechia or incarcerated strand of iris, cyclodialysis, and iridectomy. The last-named operation was performed, a keratome being inserted in such a manner that the original iridectomy was, as it were, enlarged, and the small tag of iris was removed. Except that the coloboma is larger than usual, there is nothing to indicate what had happened. A few hours after the iridectomy wound closed there was a rise of tension, controlled by the instillation of eserine, and it has never reappeared. Five years have elapsed, and the acuteness of vision is 6/5.

From another patient a traumatic cataract, which developed as the result of the explosion of a firecracker, the iris having been badly lacerated, was expressed. A fragment of capsule floated upward, and when healing was complete it was noted that this tag of capsule was entangled at the edge of the coloboma. None the less, vision was 6/5, and this vision was maintained for seven years, up to which period of time the patient had reported regularly for examination. Subsequently he did not appear for a little more than a year, when he returned with the statement that for some time he had noted failure of vision of this eye, which was now 6/15; there was some cupping of the disk, marked contraction of the visual field, and a tonometer tension of 45. Eserine was tried for a time, at first comparatively successfully, but when its action appeared to be failing the Fergus-Elliot corneoscleral trephining was performed, and the vision has been maintained at the standard that it had at the time of operation, namely 6/25, until the present time, more than three years after the operation.

Were I to summarize my thoughts in this matter, I would say that a patient should not pass from observation in these circumstances without an operation which freed any adhesion, even though the eye is white and quiet. Sometimes such an adhe-

sion may be dealt with by Lang's operation, but if this is not successful, or not feasible, an operation which releases the adhesion should be performed, even though there are no active symptoms. If, on the other hand, the patient returns, as did the last one of my series, some years after the original operation, with glaucoma already well established, but without acute symptoms, therefore a form of chronic secondary glaucoma, and if it can be reasonably ascertained that the aqueous and vitreous chambers are shut off from each other, the Fergus-Elliot operation, or one which establishes a filtering cicatrix, may be practiced. Even in the absence of detectable incarceration of the iris, or attachment of fragments of capsule after slow closure of the wound, the patient should not be so situated that frequent examinations could not be made, especially with the aid of the tonometer, and if this instrument registers a tension above the high physiological limit operation is indicated. An eserine life is not a safe one for these patients.

Very interesting are those types of glaucoma which follow closure of a corneal fistula, and even more interesting are those in which after a blow upon the eye and obliteration of the anterior chamber acute glaucoma supervenes upon its restoration. Thus, in H. Knapp's well-known case, the condition following the injury was one of obliterated anterior chamber, perfectly clear media, normal vision with corrected refractive error, and sharp glaucoma after a period of bandaging during which the chamber was restored. The late Dr. Knapp's ingenious explanation is, as you know, the following: The injury probably produced a perforation of the corneoscleral wall at the periphery of the anterior chamber, which escaped detection. Although the sinus of the chamber was obliterated by the advancement of the lens, which crowded the iris upon the posterior face of the cornea, glaucoma did not develop until the iris reassumed its natural place, because so long as it was pressed forward and the anterior chamber was obliterated, the aqueous was leaking from the corneoscleral perforation. With the closure of this perforation and the restoration of the anterior chamber, the aqueous could no longer find an outlet through Fontana's spaces, which during the time of pressure of the iris against them had become impervious.

More common, I think, certainly in my own experience (for I have never seen glaucoma of exactly the type which Knapp described), are acute rises of intraocular tension which follow the closure of corneal wounds—incised wounds, I mean—which during coaptation pinch up the iris in a tent-like anterior synechia. A case in point is the following one, seen only a few weeks ago: A fragment of glass made a clean cut in the center of the cornea, passing diagonally across its surface. The lens was uninjured. The wound remained open for three or four days, then closed, but a small tent-like anterior synechia resulted. The eye was not even flushed, the finger tension was normal, and the visual acuteness not greatly disturbed. Thirty-six hours after this closure, in the middle of the night, violent acute glaucoma began. The tension was about 60 mm., the cornea slightly steamy, and the pain excessive. After twenty-four hours of vigorous eserine treatment, there was some reduction in the glaucomatous process, but satisfactory cure occurred only when the iris was freed from its incarcerated position, only that portion being excised which was attached to the corneal wound—in other words, the ciliary border of the iris was not excised. Healing was prompt, and vision is now practically normal.

The lesson, it seems to me, from this and similar cases which I have seen is that either the patient should be kept under observation until the danger of glaucoma has passed, or he should not be allowed to disappear without freeing the iris, even though there are no symptoms at the time. Evidently it is not necessary to make a complete iridectomy. The manner in which the iris is pulled forward explains the obstruction of the filtering channels at its base, and when it snaps back into normal position, if adhesive inflammation has not taken place, the outlet of the aqueous is reëstablished.

II. *Concerning periodicity in uveal tract inflammations of traumatic origin.* Whether malaria is correctly classified as one of the etiologic factors in certain types of iritis, the so-called periodic iritis, sometimes associated with hypopyon, need not now be discussed. It would appear that sometimes this term is employed, that is, periodic iritis, because in certain uveal tract diseases marked improvement follows antiperiodic doses of quinine, although this therapeutic test proves little or nothing, especially as there has not always been a blood examination, but chiefly because most ophthalmic clinicians have observed the tendency of a number of uveal tract processes to be periodic in the severity of their manifestations, even, for example, those caused by trauma. This periodicity I think, however, has been most frequently noticed in the so-called relapsing iritis or iridocyclitis of the autotoxemic type, and, moreover, where there is no malaria, in so far as the blood tests are able to determine its presence. For example, I have at present under treatment a typical relapsing iritis, in which for nearly five months there have been a great many attacks, and many of them have appeared at intervals of seven days or multiples of seven days, although this sequence has not been exactly perfect, as a few of the attacks have occurred at irregular intervals.

Several times I have observed this periodicity in traumatic iridocyclitis, the two most notable instances being in women, carefully examined from all standpoints without finding any constitutional cause that was operative, and no local sepsis. In both instances the iridocyclitis followed cataract extraction, one patient having submitted to the operation of extraction of cataract at the hands of a surgeon other than myself, and the other a patient from whose eye I extracted a cataract; when healing was well advanced, owing to traumatism and reopening of the wound, iridocyclitis set in. The usual treatment, which need not now be detailed, was employed, and the results were none too successful. It was observed that with astonishing regularity an exacerbation of the symptoms occurred, in one patient always late in the afternoon of every third day, and in the other patient almost without exception on the morning of each fifth day. Stupidly, this periodicity was not noticed until a considerable period of time had elapsed.

Remembering that the late Dr. William F. Norris, Dr. McClure, and if I am not mistaken, Dr. Theobald in Baltimore, had advocated the use of quinine in certain types of traumatic iritis, the patients were treated precisely as a malarial subject would have been managed, with large doses of quinine during the twenty-four-hour period preceding the expected relapse, and with very prompt improvement.

What the explanation of this action is I do not pretend to say, just as we cannot explain why salicylic acid and its compounds act so happily in various types of uveal tract inflammation, even in sympathetic ophthalmia. Perhaps the fact that full doses of quinine arrest the diapedesis of the white cells from the capillaries affords an explanation of the effects of quinine in acute inflammations in that it checks inflammatory exudation and allows extruded cells to wander from diseased areas. Because, what appears to have been experimentally proven, namely, that comparatively small doses of quinine increase the phagocytic power of the blood, or because it neutralizes toxic agents in blood and lymph streams, and stimulates fresh secretions in the sense of elevating lymphagogue activity, or because it halts the activity of parasites as yet undiscovered, may explain why this drug aids the body in combating infections. It may be that the drug has some relation to the control of showers of leucocytes analogous to its control of the activities of the malarial organisms. Be this as it may, I am satisfied that quinine is a remedy which should be occasionally employed in combating long-drawn-out uveal tract inflammations, especially located in the ciliary body and iris, which are of traumatic origin, and that it has a place in the therapeutics of these affections not equal to the salicylates, but also not without distinct advantage, notably

if the exacerbations arise with periodic regularity.

III. *Concerning recurring hyphema after cataract extraction.* Five times in my cataract experience I have observed, apparently without cause, except in one instance presently to be referred to, recurring hemorrhage in the anterior chamber. Three of the extractions were with iridectomy, two without iridectomy. Three of the patients were old in the sense that they had passed the sixty-fifth year of life, one patient was between forty and fifty, and the other was a comparatively young Italian—that is, a man in the late thirties. In four of these patients no cause could be discovered except that in one the systolic blood-pressure was above the high physiological limit but not excessive, and in one other sugar was discovered in the urine, and therefore should be omitted from the list. There had been no traumatism and no complications during the operations; there was no rise of intraocular tension, no iritis, no hemophilia or leukemia, no disturbances that could be determined by blood examination, and no cardiovascular or renal disease. The hemorrhages always occurred without the slightest pain, and on several occasions, especially in the man with the slightly elevated blood-pressure, and in the young Italian, entirely filled the anterior chamber, and usually disappeared within twenty-four or thirty-six hours. All ultimately recovered, two with rather thickened capsules which required discission.

Various remedies were tried: hot and cold compresses, alternating hot and cold packs, atropine, dionin, etc.; and finally, calcium salts, which, certainly in one of the patients, were of distinct advantage—at least, after their administration this very annoying complication ceased.

Whether calcium chloride, or still better, calcium lactate, really increases the coagulability of the blood is doubtful. We all know that Addis has apparently experimentally proved that it is not possible to shorten the time of coagulation of the blood by the administration of the calcium salts, and George Dorrance's investigations have yielded a like result. With thyroid extract Dorrance's results were slightly more marked. His answer to the question, "What clinical methods shall be used to shorten an abnormally long coagulation time?" is that it depends on whether it is necessary to secure effects immediately, and whether there is a marked variation from the normal time. For example, in cases of hemophilia, melena, etc., the injection of whole blood, followed by blood serum, he believes, will usually give the desired results, and he has recently informed me that the substance coagulose is equally potent in this respect. Pituitin I have not had the opportunity of trying except once, in a patient who seemed to have recurring hemorrhage from the ciliary body following a difficult, V-shaped iridotomy. I failed to observe a favorable action. Referring again to the calcium salts, it may be said that experimental evidence and clinical facts are not always in accord, and should I again encounter recurring hyphema in the circumstances already described, I should certainly try calcium, and if it failed, coagulose or pituitin.

IV. *Concerning post-operative and post-traumatic loss of vitreous.* At the present time, when some American journals and their contributors have largely revived the interest in Colonel Smith's method of extracting the opaque crystalline lens in its capsule, it may be worth while to say a word or two in regard to large losses of vitreous, although I cannot speak of these in connection with the Smith operation, for the simple reason that I have performed it only a very few times in my life. Even if it were my habit to utilize this operation, I doubt whether I could with perfect equanimity regard a loss of vitreous of practically 8 per cent, as one operator recently records, even though I believe it has been experimentally shown that one-third of the vitreous content can be withdrawn without deleterious results, and even though Colonel Smith considers slight and even moderate loss of vitreous as of no consequence.

Certainly vitreous is occasionally lost in the ordinary cataract extraction, sometimes owing to a sudden squeezing movement on

the part of the patient, sometimes because the operator has incautiously used his cystotome, or been a trifle awkward in manipulating his knife during the section, but sometimes when it is perfectly impossible to avoid it, and when even before the operation begins the surgeon knows that vitreous is in the anterior chamber. The losses of vitreous which may occur after injury, especially incised and lacerated wounds of the globe, need not be referred to except in passing mention.

Doubtless all of us are satisfied with the advice given by the late Dr. Knapp, and, earlier than his remarks on the subject, by Dr. J. A. Andrews, namely, that in the event of a free escape of vitreous with collapse of the eyeball, healing is facilitated and the danger of infection is lessened if the globe is gently filled with a tepid physiologic salt solution. If happily a rather large conjunctival flap has been made, a few times it has seemed to me that a stitch was advantageously placed, and only once I have put a stitch through the edge of the cornea and through the bulbar conjunctiva above, and thus brought into coaptation the lips of the wound which previously were being separated by the bulging forward of the vitreous, a considerable portion of which had escaped.

Like all ophthalmic surgeons, I have seen a few times very large prolapse of the vitreous of the most alarming type, and yet the eye has recovered with excellent vision, vision which has been maintained for many years. To be sure, detachment of the retina may occur subsequently, sometimes not for months or even years after the accident, but a very common result is, I think, the presence of vitreous opacities, sometimes in the form of strings and small clot-like fragments, sometimes in fine punctate material, opacities which do not materially disturb vision, but which are very conspicuously present, in so far as the patient is concerned, in the form of muscæ volitantes.

Almost I hesitate to name the remedy which has in these circumstances seemed to me to do the most good, and yet I cannot be mistaken in my observation of a number of these patients in my own and in the practice of friends, and I find that I am confirmed in this belief by so good an observer as Dr. Wilder of Chicago. I refer to the persistent use, not of the iodides, as ordinarily administered, but of that iodine compound which is usually administered in the form of syrup of hydriodic acid, given persistently and in large doses. Usually a fluidrachm three times a day, well diluted, and taken an hour after meals, is a good starting dose, which can be speedily raised to 4 drachms three times a day. The effects are not prompt; it takes many weeks of persistent use of this drug, but it certainly does good, and if I encounter, unfortunately, a large prolapse of the vitreous, it is the custom in my service in the University Hospital to administer this remedy. Moreover, I think that in opacities which depend upon various diseases of the eye, associated with hemorrhages, particularly those types of vitreous change which one sees so frequently in angiosclerosis of the retinal circulation, in the absence of syphilis, the persistent use of this agent for weeks, and, if you choose, for months at a time, possesses distinct advantages. This recommendation does not imply that the usual therapeutic procedures shall be disregarded—diaphoresis under the influence of pilocarpine, or with the aid of electric cabinets, stimulation of lymphagogue activity by means of dionin and subconjunctival injections, etc.—but is offered because it affords a method of establishing an iodine alterative action without the frequent disturbance of the stomachic functions which active remedies like iodide of potassium, etc., so often produce.

V. *Concerning post-operative suppurative infections.* Doubtless all of us remember the late Dr. Herman Knapp's pessimism when discussing infections of this character, and will agree with him that the treatment of these processes in the majority of cases is most unsatisfactory, and at one time would also have agreed that it is only in the milder cases of partial suppuration of the flap that the eyeball is saved. It was his belief that if a satisfactory result was attained it was due to a low degree of the

virulence of the infective material and to a strong vitality of the subject, and not to any one of the many remedies used and praised for this condition. He doubted the efficiency of the galvanocautery and the various disinfectants, and believed that opening of the wound and daily draining the anterior chamber was the most efficient procedure.

It is not necessary to refer to the aggravated types, especially when ring abscess forms, which without exception terminate in extensive sloughing and panophthalmitis, or to the deep infections that have been called "suppuration in the vitreous." Something, however, may be said in regard to milder manifestations: marked edema of the bulbar conjunctiva, gray infiltration of the line of incision, thickening and discoloration of the iris, and a gray, sometimes puriform, exudation in the pupil space, and not infrequently hypopyon.

(*a*) *Cauterization.* If a cauterant is employed, and it is useful in flap infections, my own experience leads me to prefer pure carbolic acid, applied thoroughly and repeated as frequently as may be necessary —for example, several times during twenty-four hours. Its value in this respect cannot be due entirely to its germicidal power, which is not excessive, and which is not to be compared to the actual cautery, nor to nitric acid, nor even to bichloride of mercury; nor can it be due to penetration of its cauterizing action, which is not deep because of the coagulation of albumin. Can some of its effects be due to what in earlier days used to be called an "alterative action"—*i.e.,* to a mitigating influence over local cellular toxemia, independent of its bactericidal functions? I do not know, but simply record a personal belief that it is efficient, and if successful that the dense scar which follows the actual cautery is avoided and that the tendency to updrawing of iris tissue is lessened. Ziegler prefers formalin 1 per cent for flap cauterization.

(*b*) *Repeated drainage of the anterior chamber,* advocated formerly, especially by H. Knapp, may be employed, but should include an attempt at sterilization of the anterior chamber, after its irrigation by the introduction of a mixture first advocated by Ziegler, as follows: A solution of formalin, ¼ per cent, in which hyoscine hydrobrom. gr. ½ and cocaine gr. iv to ʒj have been dissolved. For this purpose it is used as frequently as may be necessary on succeeding days. In like manner, the various newer silver salts have been used, especially argyrol, as advocated by A. E. Davis and H. V. Würdemann, and also bichloride of mercury, 1:3000. I have no personal experience in these drugs thus used. Of the introduction of iodoform into the anterior chamber I shall presently speak in another connection. Urotropin, which is excreted into the anterior chamber about three hours after its ingestion by the mouth, I have also tried, without noticeable success, except perhaps once, as shall be detailed subsequently. Gradle has experimentally proved that urotropin in the aqueous humor, in the concentration in which it occurs in the anterior chamber, does not inhibit the growth of virulent microörganisms in a test tube, and from Hanzlik's investigations it appears that the decomposition of hexamethylenamin in pathologic fluids obeys the same laws as in normal circulating fluids—that is, the free formaldehyde from hexamethylenamin depends on the excess hydrogen, ion, concentration of the fluid (true acidity). Gradle suggests that although the drug is not present in sufficient concentration to kill infecting organisms, it may weaken them sufficiently to allow them to be more easily attacked by normal antibodies in the secretion.

(*c*) *Subconjunctival injections.* Once favorably impressed with the value of subconjunctival injections, my faith in them has grown less strong in so far as they are recommended in various inflammatory affections of the eye, especially of the cornea and uvea, nor have I any satisfactory results to record from their employment in suppurative infections, either in the form of bichloride of mercury, or the more frequently recommended cyanide of mercury, from the use of which a number of observers—Kuhnt, for example—have recorded cures.

(*d*) *Vaccines.* What shall be said in regard to the vaccine treatment of these infections, particularly the use of autogenous bacterial vaccines? Certainly vaccine therapy should not consist in the administration of ready-made uncertain mixtures, recently widely exploited, mixtures which have doubtless done a great deal of harm. It is probable that vaccines do not cure a process of this character unless, as the result of other means, or owing to natural defenses, the subsidence of the infection has begun, or, in ordinary words, unless cure has started, when the vaccine may give it an additional impetus. This, if I am not mistaken, is the dictum of Theobald Smith. But they must not be disregarded. Twice in recent years I have seen very active post-operative infection apparently take a favorable turn after the administration of autogenous vaccine, once streptococcus pyogenes, and once staphylococcus vaccine. In both instances, prior to the employment of vaccine therapy, the usual procedures had been tried. Once in an old colored man urotropin was administered in conjunction with the bacterin, and the result was astonishingly good, in the sense that the process rapidly subsided and cure followed, with an excellent eye.

With the use of autogenous vaccines in infected ulcers of the cornea of traumatic origin my experience has been a larger one, and in conjunction with the usual local treatment, it has seemed to me in a number of eyes, two or three of them with very elaborate hypopyon, that the recovery was hastened with their aid. I have used staphylococcus, pneumococcus, and streptococcus bacterins, and once a bacterin made from streptococcus mucosus, which I obtained in pure culture from a serpent ulcer of the cornea following an abrasion. I have also used a combined urotropin and bacterin therapy with good effect. A similar combination has also recently been advocated by Charles of St. Louis.

Whether optochin therapy would yield practical results in localized post-operative and suppurative infections, provided they were of pneumococcic origin, I do not know, nor have I seen any accounts in the literature which indicate that ethyl hydrocuprein has been tried in these circumstances. Certainly some of the reports of its value in combating serpiginous ulcer of the cornea due to pneumococcus are very favorable. As it seems, also, to have an influence on other microörganisms, for example, even gonococci, if the reports from the Budapest Eye Clinic shall be credited, it may be worth consideration, even if the pneumococcus is not found. Dr. Holloway of my staff has used the remedy in 1-per-cent solution with what appear to be brilliant results in an infected ulcer of the cornea associated with a high grade of iridocyclitis, after the usual remedies, including vaccine therapy, had failed. From this ulcer it was not possible to cultivate a pneumococcus, but only a pyogenic staphylococcus.

VI. *Concerning Post-operative delirium.* As we all well know, mental disturbance after operations upon the eye, particularly after the extraction of cataract, is not very uncommon, and usually manifests itself during the evening of the second or third day after the operation. The degree of mental disturbance varies greatly. Sometimes it appears merely as a temporary confusion of ideas, and sometimes as a violent delirium, associated with aggravated hallucinations.

Naturally, the etiology of this condition has attracted a great deal of attention, and all manner of theories have been advanced. It has been suggested that the disordered cerebration depends upon a special predisposition; or perhaps upon the fact that the patient has been mentally unbalanced before the operation, and that the operation has simply been an exciting cause, or, to use Parinaud's phraseology, the condition depends upon extreme preoccupation of the patient for the days preceding the operation—that is, although apparently calm, the patient really is in a state of suppressed excitement, which excitement liberates itself in this explosive manner after the operation is completed and the patient has been retired to a darkened room with bandaged eyes. Indeed, bandaging of the eyes itself has been supposed to cause the delirium,

because it has been noted that in some instances immediate relief followed when the bandage was removed from the unoperated eye, thus permitting the patient to come in touch with his surroundings. Again, the delirium has been attributed to the administration of drugs prior to the operation, and particularly to the instillation of atropine solution in the operated eye. Restriction of diet, alteration in the diet, the withdrawal of stimulants to which the patient has been accustomed, and the like, have all been brought forward as etiologic factors, and finally, it has been maintained, and it seems to me with a good deal of weight, particularly by Fromaget, that the delirium is due to an autoinfection depending upon uremia, or upon the absorption of toxins from the intestines.

Evidently no one cause can explain all of the cases. I am sure that delirium may follow cataract extraction as the result of the bandage, and that it will disappear when the bandage is removed. Sometimes enterogenous intoxication explains the mental disturbance, but I am not prepared to say that any or all of the other causes may not be operative. It should be remembered that occasionally beginning confusion of ideas may be prolonged into a form of dementia which will last for months. An instance of this character occurred in my wards in the Philadelphia General Hospital some years ago. The patient ultimately recovered, with perfect healing of the eye from which the cataract was removed.

I would not make reference to this very ordinary condition of affairs except that I would like to say a word or two in regard to the treatment. Naturally, the ordinary management includes removal of the bandage, at least from the unoperated eye, relief from confinement in bed, free purgation, or, even better, colon lavage, the discontinuance of atropine, and the like. The administration of morphine is tempting, but this does not appear to act satisfactorily. In point of fact, if it is not contraindicated by general conditions and the age of the patient, it occasionally certainly aggravates the delirium. Far better than morphine is hyoscine, the 1/150 or 1/200 of a grain hypodermically. This remedy has doubtless been used by all of us, but in one notable instance, when all medication appeared to be fruitless in its results, and a violent delirium, or perhaps, more accurately, stage of excitement continued, I remembered that alienists occasionally consider paraldehyde, in spite of its disagreeable taste and odor, to be a remedy of great value in securing sleep in mild types of insanity, and so it proved to be in the case of my patient, and is therefore suggested as one of the therapeutic agents which may be considered in this complication. Its disagreeable taste may be at least alleviated if the formula of Yvon is employed, in which the paraldehyde is administered in a solution which contains alcohol and tincture of vanilla.

VII. *Concerning post-operative inflammations in gouty subjects.* As is well known, the term retrocedent gout has been applied to the condition in which a gouty process suddenly leaves the toe or other joint, and attacks some one of the internal viscera, producing, it may be, purging, vomiting, asthma, angina pectoris, etc., although according to Hare's investigations, the accident, if it may be so named, is a rare one. Whether it is proper to apply this word retrocedent to the condition which I am about to describe, and which, certainly in several instances, was rather startling, is more than doubtful. I permit myself to detail a conspicuous example of this complication. A patient in vigorous health, in spite of his eighty odd years, but for more than a quarter of a century subject to violent attacks of gout in the right foot, particularly in the great toe, came for the removal of a cataract. This was smoothly accomplished, and convalescence particularly rapid. On the third day after extraction, while sitting in an easy chair in his room, his right toe blossomed into a typical gouty manifestation, becoming extremely swollen, red, and tender. Under the treatment to which he was accustomed the attack rapidly subsided, with a profuse sweat and a sudden drop of temperature below the normal limit. Within six hours after the subsidence of this podagra, the

eye, previously perfectly white and quiet, began to flush, and very quickly passed into a violent iridocyclitis, characterized, amongst other unpleasant symptoms, by a very decided rise in intraocular tension and a deep haze in the cornea of most threatening character. Free purgation, a mixture of salol and phenacetine, which he was in the habit of taking and which he preferred to the salicylates, dionin, holocaine, and eserine, resulted in a comparatively rapid cure, and after the subsidence of the iridocyclitis a somewhat thickened capsule was divided with a Ziegler knife, and the resulting vision was practically normal. It may be objected that this was not a gouty iridocyclitis, and that the patient would have encountered this complication in the absence of his gout. But the significance which I have given to the attack is not entirely unreasonable inasmuch as the eye was perfectly white and quiet, and the violent onset of the iridocyclitis so quickly followed the sudden subsidence of the foot gout.

It is doubtful whether the next case to which I shall refer belongs in this category, but it is interesting in many respects. From the eye of a Belgian glassbower I removed a cataract by simple extraction, without complication, and none occurred during the first week after the operation. Then the Resident Physician informed me, what I am ashamed to say neither of us had discovered prior to the operation, that the man had a gleet, or perhaps, more accurately, the later manifestations of a Neisser urethral infection. What exactly the treatment of this urethral complication was I am unprepared to say, but I assume it consisted in ordinary injections. Be this as it may, just about the time the man was ready to be up and about, a sharp attack of epididymitis developed, and during its continuance, or at least during the continuance of its acute symptoms—*i.e.*, for about a week or ten days—he remained in bed. Shortly after its subsidence, the eye, in the meantime having been perfectly white and quiet, with a round pupil and not a trace of posterior synechia, was attacked, rather suddenly, by a very sharp iridocyclitis, the cyclitic manifestations being predominant, and the anterior chamber unusually deep. There was no rise of tension, but for two days a very faint line of yellowish exudate appeared at the bottom of the anterior chamber—in short, a narrow hypopyon. Mydriatics and leeching, together with dionin, were employed, but the remedy which gave the promptest relief consisted in a series of hypodermics of pilocarpine, sufficiently potent to induce very free diaphoresis, and full doses of potassium iodide. With commendable rapidity the attack subsided, and the ultimate vision was practically normal. Whether one should regard this attack as gonorrheal in origin I am not quite prepared to say, but it certainly gave me the impression that this infection best explained the condition of affairs. It is described now not only because of its clinical interest, but also because it gives an opportunity to speak of what appears to be a useful remedy in the treatment of iridocyclitis of Neisser origin, namely, pilocarpine sweats; at least, they have always seemed to me to be more efficacious in this form of iritis than ordinary diaphoresis, although they do not seem to act more beneficially than this ordinary diaphoresis when the usual indications for sweats present themselves. Neisser bacterin has distinct value in the therapeutics of this affection.

Reverting for a moment to operations on the eyes of gouty and so-called rheumatic subjects—cataract extraction, for example—it is my practice, other things being equal, to exhibit in moderate doses, during convalescence, aspirin and salicylates, and to urge the liberal drinking of Vitell or similar waters. Perhaps this may be regarded as unnecessay, but with one or two experiences in mind this practice has seemed to me not to be an unwise one.

VIII. *Concerning infections after penetrating foreign body injuries.* Unhappily, injuries of the eye from penetrating fragments of steel and iron do not always come under observation very early, and may present themselves with every sign of well-established infection: pus in the anterior chamber, purulent infection of the wound

of entrance, and turgid, discolored iris, or these conditions may develop after the body is extracted. The usual treatment need not be repeated, but it may be worth while briefly to state the experience of my service in the University Hospital with one or two methods which have been recommended in these circumstances. It will be remembered that if the wound of entrance has been through the cornea, and the anterior chamber contains pus, Haab has recommended, after the evacuation of the purulent material, that small rods of sterilized iodoform, one or two, according to the existing state of affairs, shall be introduced within this chamber. He has also described their introduction directly into the vitreous, when infection has begun in that region, and has reported successes. To be sure, this method of intraocular disinfection has been sharply criticized, especially by Krause, who not only doubts the value of iodoform in this respect, but maintains that of itself it may produce pathologic changes. In my own experience only twice have these rods apparently been of any service, but even in these instances I am unprepared to say whether the iodoform was of value or not, inasmuch as another procedure, to which I would like to refer, was adopted, to-wit, after the evacuation of the purulent material from the anterior chamber the lens which had been injured was carefully expressed and every particle thoroughly washed out by means of an irrigator charged with a physiologic salt solution. Such an evacuation of the lens is an important factor in the management of an eye under these conditions, and the saline irrigations should be repeated, copiously, as frequently as any signs of purulent reaccumulations are evident. This practice has also been recommended, it will be remembered, by Randolph of Johns Hopkins. In neither of the eyes saved by this procedure was there any indication of vitreous involvement. In place of iodoform rods, used as has been described, Maitland Ramsay prefers gelatin rods impregnated with collargol. With these rods used in this manner I have no experience, but shall presently refer to this agent employed for a different purpose.

IX. *Concerning the use of conjunctival flaps.* Doubtless all of us, after abscission of a prolapse of the iris, particularly at or near the corneoscleral margin, have closed the wound with the aid of what used to be called a Gamo Pinto flap—in other words, with a conjunctival flap taken from the bulbar conjunctiva, twice as large as the original opening, into which it is gently inserted with a probe; and all of us have employed for the various purposes recommended, originally by Schoeler and later by Kuhnt in his well-known monograph, subconjunctival flaps to cover gaping scleral, corneoscleral, and corneal wounds. If the vitreous chamber is exposed because of a wound through the sclera, it presents an inviting culture medium for invading microorganisms, and there can be no doubt, in the language of Byers, if this port of entry is covered by conjunctiva, that this richly vascular membrane is able to deliver an abundant supply of agglutinating lymph, which gums the lips of the wound, that it furnishes a force of protecting leucocytes, and that its epithelium and subepithelial structures materially assist in the repair of tissues with which they come in contact.

Occasionally the source of infection resides not only in the areas of the cul-de-sac surrounding the wound, but if the injury has cut through the lid, as well as the eyeball, infection may arise from the former position, and I have the greatest confidence in a flap of conjunctiva which covers a large, gaping, corneal wound, or, for that matter, a scleral wound, particularly if this flap is so placed that the line of sutures does not overlie the scleral or the corneal wound, but is so situated that it extends to one or other side of it. An interesting experience that I have had on one or two occasions is the treatment of an extensive transverse incision of the cornea by completely covering this membrane with conjunctiva, after the manner of the late Dr. De Wecker. Thus, one case history is as follows: A patient, a colored woman, came with a severe injury of the lid—a cut with a piece of dirty glass —which directly overlay a transverse in-

cision of the cornea from one side to the other, into the entire length of which the iris had prolapsed. The lid wound, when the patient came to the hospital, was already infected. After cleansing its margins, uniting them with sutures and removing the prolapsed iris, the cornea was covered with conjunctiva, which was dissected back to the insertion of the ocular muscles and secured over the cornea with a purse-string suture, where it was allowed to remain for eight days, when the stitch was cut and the conjunctiva put back into place. The corneal wound was found completely healed, without the least sign of infection. Naturally there exists a long, linear scar traversing the corneal surface. This procedure I have practiced a number of times, as doubtless have all of us, with very great satisfaction.

Ordinarily a scleral wound covered with a conjunctival flap, for example, after a knife thrust, or when a large piece of steel has been removed through a scleral incision, heals perfectly without a scleral stitch. It is not necessary to recite the arguments for and against scleral stitches. In my experience, and I think in that of most operators, a gaping scleral wound, and especially one which is of a shelving character, so that the upper flap slips away from the lower beveled edge, heals more satisfactorily if it is coapted with very fine catgut, after removal from between its lips of prolapsed tissue—iris, vitreous, or choroid. Prior to the introduction of the stitches, the edge of the wound should be painted with a 5-per-cent solution of iodine, which serves a more satisfactory purpose than bichloride of mercury, ordinarily recommended. I am interested to observe that the pencilling of scleral wounds with a 5-per-cent solution of iodine was advocated in the January meeting of the North of England Ophthalmological Society.

In the best of circumstances a little secretion, perhaps puriform or even purulent in character, is apt to gather around stitches placed in the conjunctiva—for example, after an evisceration, or an implantation, or when the corneal flap has been sewed in place after a corneoscleral trephining. Since I have painted the line of sutures with the iodine solution this complication has seemed to be less apparent. Equally satisfactory, or even better than the iodine, is a mixture which in the University Hospital we call Whitehead's varnish, and which is composed of iodoform 1 part, compound tincture of benzoin 6 parts; to be made with ether. This same varnish, by the way, I always use along the line of sutures—for example, in a lid operation—and do not find it necessary afterwards to apply a bandage or any other form of covering. In place of a covering of conjunctiva for a recent corneal or eyeball wound I can indorse a practice recommended by Maitland Ramsay, to wit, that a wafer of gelatin containing 10 per cent of collargol shall be placed over the wound. The collargol gelatin, as Ramsay maintains, adheres to the wound, and under it healing progresses with favorable rapidity.

X. *Concerning the treatment of traumatic iridocyclitis.* Non-suppurative inflammations of the uveal tissue, particularly iridocyclitis following accidental and operative wounds of the eyeball, are common enough. It is not necessary at present to discuss their origin—that is, whether they have been caused by the ordinary saprophytes of the conjunctiva, which, in the language of Axenfeld, find a specially favorable medium in the aqueous, particularly if resisting power is low; whether they may be due to pyogenic organisms, which do not always create a purulent process, introduced at the time of injury, or finding their way into the wound through the medium of unclean instruments or impure lotions. What shall be done to prevent this complication, or to modify its virulence after it arises? In answering this question I venture to detail what is practically a routine treatment in my service in the University Hospital, a treatment which doubtless has been used by every one of us.

(*a*) *The application of cold.* Practically always cold is applied by means of compresses thoroughly chilled upon a block of ice, from which they are transferred to the affected eye with sufficient frequency to keep up a uniform cold impression, and this means that they are changed every fifteen

to twenty seconds. If extract of hamamelis is poured over the pads, it has always seemed to me that they are more agreeable to the patient than when they are simply damp with iced water. Firmly I believe that they should be constantly employed, and not, as is so frequently advised, for ten or fifteen minutes out of each hour, and I have often permitted them to be used for several days at a time, which means both night and day application. If existing edema of the lids does not subside under their influence, or if, not having been present, it arises, and especially if pain occurs, very much such as takes place when very cold food, for example, ice cream, is rapidly eaten, and which I suspect depends upon some congestion of the accessory sinuses, it is an indication to discontinue them. I am firmly convinced, however, that hot compresses in these circumstances are not advisable. Thus I am very sure they are not when there is an actual purulent inflammation, and I do not believe they are good even when the condition is a non-suppurative one.

(*b*) *Mercury.* After injuries of the iris and ciliary body, liable to create inflammation, or if the inflammation is already existent in the form of a traumatic iridocyclitis, my experience coincides with that of Schirmer, that mercury is a most valuable agent. His recommendation that the mercury shall be administered by means of inunctions is well known. This also I have tried, but it has seemed to me that equally good results are obtained if calomel is given, for a number of days at least, not in such a manner that it shall produce purgation, but that its constitutional impression shall be made. What the action of mercury is under these conditions I do not know. Axenfeld refers to the etiologic relationship of pyogenic organisms to various types of traumatic subacute and chronic iridocyclitis, speaks of Schirmer's mercurial treatment, and says that its use against a definite organismal wound infection cannot be decided by the findings in the human eye. So far as I know, it would be most difficult to decide whether in these circumstances mercury has a bactericidal action —that is, when it is given, for example, by inunction, or by mouth, in the form of calomel—comparable to its spirillicidal influence. In earlier days mercury was much used to combat inflammation, and regret has often been expressed that more examinations of the blood of ptyalized persons has not been made, in order to find out what the mercury does to the blood. If it be true that the increase of hemic fibrin is one of the characteristics of inflammation, it may afford some ground for the belief that there is, to quote the words of a great American therapeutist, more or less antagonism between the processes of mercurialization and of inflammation. Be this as it may, the clinical fact remains that mercury is of great service in various ocular traumatisms, not only in combating symptoms when they have arisen, but in preventing their elaboration. My own plan is to follow the action of mercury with the salicylates, or, and this has frequently seemed to me to be of service, to combine the salicylates with mercurials. Should this be deemed advisable, the mercury, following Schirmer's advice, is used by inunction. How salicylic acid and the salicylates control uveal tract inflammations is unknown.

As we know, Gifford studied the subject and showed that the bactericidal influence of the drug was so slight that it could scarcely be a potent factor in this action. It has been suggested that the salicylate may cause a local depletion in the inflamed area, the arterioles of which have been dilated *ad maximum* by the bacterial toxins by producing a general capillary dilatation, and apparently this view is accepted by Hanzlik in his recent critical review of the salicylates, or rather of the literature which pertains to them. I have usually given the salicylates in large doses, although not so large as Gifford advises in sympathetic ophthalmia, but following an old rule of my therapeutic master, Dr. H. C. Wood, that other things being equal, and the age of the patient permitting, 80 grains should be administered during the first twenty-four hours, 60 grains during the second, 40 grains during the third, and so on; but I have not hesitated to use even larger doses

when they seemed advisable. This curious observation, which doubtless has often before been made, has seemed to me interesting, namely, that if the salicylate administration is followed by violent tinnitus early in the exhibition of the remedy, its favorable ocular effects are not so manifest, but if the patient takes the remedy without cardiac or stomachic disturbance, and without producing any deafness, the uveal tract inflammation is apt to subside more promptly.

(*c*) *Lymphagogues and analgesics.* Naturally, the indications for stimulating lymphagogue activity are present, and we all turn to dionin, which in my experience is very much more effective if it is administered with holocaine. Dionin has always seemed to me more efficient if it is begun in comparatively weak solutions, say 2½ per cent, and then every third or fourth day the percentage raised to 5, to 7, and to 10 per cent. This procedure is better than the one often recommended of using the drop for two or three days and then discontinuing it until immunity subsides and the dionin reaction is reëstablished. If irrigations are required, either on account of conjunctival secretion or because of secretion gathering around the edges of a wound, my best results have followed the use of physiologic salt solution. When mydriatics are indicated, and usually they are, clinically at least, it has appeared to me that there was distinct advantage in using scopolamine in addition to atropine, the first drug in a strength of 2 grains to the ounce, and the latter in a strength of 5 grains to the ounce.

It will be remembered that in the endeavor to explain the action of the salicylates in combating such inflammations as are now in discussion, it has been suggested that it depended upon the fact that it causes diaphoresis. In reply to this the statement has been made that this explanation cannot be accepted because the ordinary active diaphoretics are not potent in subduing these inflammatory processes. With this statement I would disagree—that is, it has appeared to me on more than one occasion that a violent traumatic iridocyclitis has been materially benefited if in addition to the measures already indicated active diaphoresis was produced, preferably by means of a cabinet bath, if the patient is able to be placed in one, or if not, with the patient wrapped in blankets which are heated by means of guarded electric bulbs until free sweating is produced.

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## THE NON-OPERATIVE TREATMENT OF LABOR.[1]

BY EDWARD P. DAVIS, M.D.,
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The great gain made recently by obstetric surgery is striking and self-evident. It may not be inopportune to raise the question, What improvement has been made in the conduct of parturition not requiring an obstetric operation of considerable gravity?

The old practice of obstetrics was characterized by tedious uncertainty and by work done under great disadvantages, which often made impossible the best results. The practice of obstetrics in former times was essentially domestic, and the home of the patient was the place where any and all treatment, however difficult, was carried out. With the advent of the modern hospital and the development of antiseptic surgery, the most complicated and critical obstetric cases have gradually been given modern advantages. But in many instances the old conditions still prevail.

If we inquire what has made the average practice of obstetrics difficult and unsatisfactory, we find two important causes: first, economic reasons, and secondly, domestic superstition.

By economic reasons, we mean that compensation for attendance upon obstetric practice has been so little in comparison to

[1]Read before the Alumni Association of the Sloane Maternity in New York, April 23, 1915.

equal skill and attention given to other cases that such practice has been avoided, and often done unwillingly to keep the medical practice of a family. The public have been so imbued with the idea that labor is a natural phenomenon and requires little if any attention, that they fail to recognize the value of skilled services in this department of medicine. Again, the ovarian tumor once removed will probably not return; the removal of a fibroid uterus will often end the patient's disease and discomfort; a patient recovering from typhoid or pneumonia hopes not to undergo a second experience. But the tumor removed from a pregnant uterus grows and causes expense and trouble from the moment of its advent. There seems to be no end to the highly contagious and incurable disease known as humanity, and so the public reason that they cannot afford to pay so much for getting into trouble as they might willingly give for getting out of difficulties. The fact that the profession has been willing to undertake in private houses, often single-handed, difficult operations which the surgeon would not risk except in hospital has led the public to believe that this is a right and proper procedure.

Domestic superstition has thrown around human parturition many obstacles to scientific progress. The firm belief in the mind of the mother of the patient that she, by virtue of age and experience, knows more about her daughter's case than any physician can; the belief that it is unworthy and reprehensible to have a child born anywhere but in the home; and the proclivity that friends and relatives show to give gratuitous advice regarding these cases, combine to make them often difficult to manage. In this connection it is interesting to observe that the absolute essential of Krönig and Gauss's modern method of treating spontaneous parturition consists in absolutely excluding friends and relatives from the presence of the patient.

If we inquire how these difficulties to essential progress in obstetric art may be overcome, we suggest that obstetrics should be recognized as a specialty of equal importance with other branches of surgery. The logical conclusion of this proposition might lead to the abandonment of spontaneous parturition to the care of midwives; but this cannot obtain in our country because our population is educated to demand better attention than the midwife can give. The public will not believe that obstetrics is a specialty until they see it practiced as a specialty by men specially educated and trained to carry out in all cases an antiseptic and aseptic technique, and who are familiar with such surgical procedures as may become necessary.

The question arises, Will it be possible to put all obstetric practice in the hands of the specialist? In considering this we may turn to the practice of surgery. The well-educated general practitioner does not hesitate to open abscesses, close unimportant wounds, stop moderate external hemorrhage in emergency, and often set a fractured limb or reduce a simple and minor dislocation; but he does not attempt to reduce a dislocation of the neck of the femur or of the head of the humerus, nor does he attempt the major operations. So the general practitioner will conduct spontaneous and uncomplicated parturition, close superficial lacerations, and prevent threatened hemorrhage, without attempting major obstetric operations.

I believe, however, that no essential gain will be made in obstetric art until great importance is laid upon obstetric diagnosis. The specialty of the general practitioner in all branches of medicine is diagnosis. He is frequently the first to see the patient. Upon his diagnostic power will depend the choice, wise or unfortunate, of the method of treatment. If he cannot recognize serious conditions valuable time may be lost and valuable lives wasted. He may not have the skill, experience and equipment to undertake surgical procedures, but diagnosis he *must* know for the good of the patient and the honor of himself.

In accordance with this idea, I have for some time laid special stress in teaching the senior class at the Jefferson Medical College upon the cardinal points in obstetric diagnosis. They are frequently told that but a small percentage of them will become

obstetric surgeons, and it would be a misfortune to the community should it be otherwise. But with few exceptions all recent graduates, while finding themselves, will be called upon to make diagnoses, and upon their success in this will depend their future development, and often the life and health of the patient. Thorough diagnosis in obstetrics will classify cases into those which demand especial attention and hospital facilities, and those which in all probability will require little help and may safely be conducted in their homes.

The public are rapidly becoming educated in this matter. One of the keenest criticisms I have ever heard of an obstetric operation came from an Italian, who had witnessed with dismay the fruitless efforts made by a practitioner to deliver his wife with forceps. In graphic language he drew attention to the fact that the doctor had not made traction in the axis of the pelvis, that he had not applied the forceps to the sides of the child's head, and that his procedure must inevitably fail.

The public are now alert to notice whether the medical attendant makes a careful preliminary survey of the patient, whether the pelvis is measured, the urine examined, attention given to the hygiene of pregnancy, and proper precautions instituted for the approach of confinement.

A further and most important step in the education of the public, and one which is rapidly progressing, is the necessity for hospital care in complicated confinements. In cities having abundant hospital facilities it has for some time ceased to be uncommon to have confinement cases seek the aid of hospitals. But education of the public is desirable in obtaining pre-maternity care in the interests of both mother and child. In how many cases is this absolutely neglected?

The prime importance of obstetric diagnosis lies in its recognition of conditions which must make spontaneous labor impossible. A contracted pelvis, the overgrown child, the transverse position, the parietal bone presentation, and the presence of a tumor blocking the pelvis, take the case at once out of the class of spontaneous parturitions and place it among those requiring surgical procedure. Too much stress cannot be laid upon the responsibility of the medical attendant in this matter. Many of the obstetric tragedies brought to the attention of obstetricians arise through the carelessness, ignorance, or haste of the practitioner who first sees the patient. Many conditions can be recognized during pregnancy, and the patient referred to hospital for successful confinement, which if undetected or neglected may result in grave danger and injury to mother and child.

An exact classification of those patients in whom one may expect spontaneous delivery, and those who should have the surroundings and equipment of hospital, is difficult. The treatment of normal labor applies only in normal individuals, and how rarely do we see them. Spontaneous parturition may occur precipitately or after great delay. In sudden violent labors, severe lacerations may be sustained, causing hemorrhage from torn vessels, and exposing the patient to the danger of infection, so delay followed by spontaneous birth may bring about relaxation of the uterus and hemorrhage. In neither of these cases has the parturition been accomplished by an obstetric operation, and yet grave dangers have arisen in the case. If we were to classify the cases into those which may with reasonable safety be left at home and those which should go to hospital, we may say that all primiparous patients should be delivered in hospital, if possible; also those multiparæ who give a history of difficult preceding parturition. It goes without saying that all abnormal patients should be referred to hospital care.

This would leave for the general practitioner that rarest of all obstetric patients, the perfectly normal primipara, and those multiparæ not exhausted nor injured by previous labors, and in sound physical condition. Cases in which in all probability extensive laceration will accompany spontaneous parturition should be referred to hospital, or put under the care of skilled obstetricians if they insist upon remaining at home.

In the non-operative treatment of labor, the case having been correctly diagnosti-

cated as one in which the elements for spontaneous parturition are all present, must be conducted with two important objects in view: first, the prevention of exhaustion; and secondly, the relief of pain.

As regards the first, the introduction into obstetric art of the trained nurse has revolutionized the management of the first stage of labor. Formerly this was left to anxious and gossiping relatives, who frequently gave the patient worse than no aid, and kept her in a condition of excitement which induced exhaustion. At present the trained nurse protects her patient from depressing influences, lessens suffering and delay by seeing that the bowel and bladder of the patient are frequently emptied, induces rest by making the patient as comfortable as possible, and sustains her strength by giving her proper nourishment at proper intervals. The feeling of security which the presence and care of the disciplined, skilful, and self-possessed nurse affords is an element of great value in securing a successful first stage. This is essentially the nurse's province in labor, as she usually has the patient to herself alone, and is often personally responsible for her success or failure. She should carry the patient through this trying time with the minimum of delay and suffering, and bring her to the active stage of parturition in good condition. With the nurse, as with the general practitioner, a thorough drill in obstetric diagnosis is requisite. She must know the signs of labor which is progressing naturally and successfully, and the symptoms of failure in progress and threatened exhaustion. She may with propriety be taught to listen for fetal heart sounds, and she should be able to diagnosticate rupture of the fetal membranes. As to whether she should be trained to make vaginal examinations, there may well be difference of opinion. Personally, I should extend this duty only to those nurses whom I have known for some time, who had received such training by acting as head nurses or clinic nurses in maternity hospitals, and in whose asepsis and antisepsis I had every reason to have confidence. Were these conditions not fulfilled I should certainly be strongly against it.

Shall drugs be employed in mitigating the nagging and irregular pain of the first stage of labor, or shall the patient be allowed to worry through as best she may, receiving no further aid than that given by the nurse?

There can be no question concerning the value of analgesic drugs during the first stage of labor, which by its duration, and the nagging character of the pains, threatens exhaustion. Among the remedies which have survived long usage opium stands easily the first and most important. Perhaps the only real benefit to the public arising from the present popular discussion of this subject will be found in the education of the public to expect hypodermic injections. Thus, morphine and atropine may be given hypodermically without remonstrance by the patient, where formerly dread and dislike to this method were encountered.

With the first stage of labor dragging on through the night with but little progress, and threatened exhaustion, this familiar expedient is best of all. For simple nervousness only, the use of bromide of sodium, given by the mouth, impresses the patient with the idea that something is being done for her. During this stage of labor one may best interpret this phenomenon by calling to mind what is our knowledge concerning pain. This may be described as the reaction of the cerebrum to disturbing impressions. When, however, pain is so severe as to depress the vital centers the phenomenon of shock develops. The pain of parturition is seldom a symptom of the patient's danger. It rarely disturbs the pulse, temperature, or respiration. Its logical treatment then calls for those remedies which soothe the cerebrum.

This view of pain explains the success of the endeavor to treat the patient by appeals to the imagination. Thus the Christian scientist who at a safe distance treats the patient by prayer, the belief in a certain sacred or holy object, the finer challenge to maternal ambition with the resolve to endure pain—all illustrate the brain treated by suggestion.

But difficulty in managing these cases mentally lies in the fact that there is no

period of rest and sleep, such as one observes in the second stage of labor between active uterine contractions. It is the constant nagging character of the pain which makes it difficult to control it except by narcotics. Possibly the greatest mistake which could be made at this time would be the attempt to lessen the patient's suffering by the use of an anesthetic. I well remember a case seen in consultation in which a physician, more sympathetic than wise, had caused a woman in her first labor to inhale ether during the greater part of the day. She finally came to the second stage thoroughly drunk, requiring delivery by forceps, followed by relaxation of the uterus, and severe hemorrhage.

The power of the brain to paralyze the efforts of labor may be observed in those cases in which abject fear prevents the normal development of parturition. In my experience a young primipara, illegitimately pregnant, had been told by a fortune-teller that she would die in labor. With difficulty, and under constant attention and stimulation, she passed through spontaneous parturition, but died of heart-clot a few hours after.

Here comes in the efficiency of the disciplined and self-possessed nurse, who during the tedious hours of the first stage of labor may study the patient's mind and comfort and encourage her.

In my experience, few patients, however apparently normal, last through the second stage of labor without some evidences of exhaustion of the nervous system. Here the element of time is of importance, for the child is subjected to more or less pressure, and delay may be fatal to the fetus if not to the mother. Here again the hypodermic method may serve as well, and in my experience the hypodermic use of strychnine and digitalin in moderate doses is valuable. In patients greatly depressed by suffering I am accustomed to add to this a moderate dose of codeine.

The posture of the patient during the second stage of labor is of primary importance, and may assist greatly in the mechanism of labor, thus avoiding delay and fatigue.

At the moment of the expulsion of the child abundant experience proves the value of the inhalation of ether to the degree of temporary but complete unconsciousness. To carry this out successfully the obstetrician must wait until the presenting part is thoroughly distending the pelvic floor and perineum. If the bimanual method of managing labor be adopted, the patient is turned upon her left side, the right hand of the obstetrician filled with antiseptic gauze is held over the anus and pelvic floor, and the left hand placed between the patient's thighs. In controlling the exit of the head the time may be chosen when the head is completely under control to induce rapid anesthesia. With the patient unconscious, the head may be held with the left hand while the right hand slips the perineum and pelvic floor over the face of the child, and the head is born. When the anesthetic is removed the patient will arouse sufficiently to expel the remainder of the child's body without undue delay. Should uterine contraction be needed, rubbing the uterus through the abdominal wall will bring about the desired contraction.

If the patient is not nauseated during labor, the old custom of giving a teaspoonful of fluid ergot by mouth may be followed just before the obstetrician is ready to express the placenta. If there has been irritability of the stomach, again the hypodermic method may be used, and aseptic ergot given beneath the skin, with also a hypodermic injection of strychnine and atropine. The delivery of the placenta should follow speedily, and the uterus should promptly contract.

Shall lacerations be immediately closed, or shall the practitioner await his convenience in this matter?

My experience leads me to believe that the immediate closure of lacerations, including those of the cervix, is indicated. Where the patient is exhausted, or the physician needs assistance, and the surroundings are unfavorable, a delay of twenty-four to thirty-six hours may be practiced to secure the proper conditions. In immediate repair of cervical injuries we have had 80 per cent complete union, 10

per cent partial union, 10 per cent no union, with no case of septic infection.

Here again we come upon the difficulty of successful closure of considerable lacerations by the general practitioner. Our classification of obstetric cases would send to hospital those in whom one could anticipate serious laceration. But the unexpected often happens, and deep and extensive tears may follow spontaneous birth. Unless the practitioner is equipped in skilled experience he would do well to delay until he can summon assistance and secure favorable conditions for the operation.

We have endeavored to indicate that the non-operative management of spontaneous labor is only possible where critical and accurate diagnosis has first assigned the given case to the class in which one should expect successful spontaneous labor with a minimum of injury, delay, and danger. Even under these favorable circumstances the practitioner must give to his patient intelligent, watchful nursing, thoroughly clean and aseptic surroundings, intelligent comprehension of the phenomena of labor, skilful and intelligent use of reliable drugs, and considerable experience and skill in the delivery of the child and the repair of minor injuries. How often do these conditions obtain in what are erroneously styled natural births?

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## THE EMERGENCY PERIL IN AMERICAN HOSPITALS—A PLEA FOR EFFICIENCY IN THE ACCIDENT WARD.

BY JOHN B. ROBERTS, M.D.,
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This communication is in a way a supplement to that read some years ago entitled "The Anesthesia Peril in American Hospitals."

Two essentials of efficiency in hospital service are that morbidity and mortality be not increased by unwise first aid in emergencies or by a perilous use of anesthetic agents in operative work. A travesty of modern surgery in many hospitals has been, and still is in some, the entrusting to inexperienced physicians the first-aid treatment and the administration of general anesthetics.

Both of these professional duties require the technical knowledge, the mental alertness, and the trained judgment which are attained only by familiarity with the actual realities of emergency surgery. Never was a big game hunter made by reading books on the fauna of Africa; or a "Captain Courageous" by listening to sailors' yarns on the summer shores of East Gloucester harbor.

To expect a young graduate of even the best medical school to be efficient in dealing with hemorrhage from a crushed thigh just released from the pressure of a railway train is equally fatuous. Greatly imperiled is the safety of an unconscious drunkard with chronic nephritis and a broken skull when admitted to an accident ward under the sole control of a medical novitiate fresh from the graduation exercises. One such interne "knows it all" and does not wish to be shown. He does harm by the "cocksure method." He may break up the lucky impaction of a fracture in the neck of the femur of an old woman, and insist upon amputating every denuded finger that looks as if integumentary covering for it was not to be found. Neither action is good surgery. Another of less impetuosity may turn into bed, in the accident service anteroom, and let a patient choke to death from edema of the glottis, because his slow mind had not thought of this contingency requiring a tracheotomy tube or an open pocketknife to be within easy reach.

Neither man is fit for accident service in the first year of his professional life; and yet both may by a few years' training become skilful surgeons.

A good many years' experience in hos-

pital practice has induced me to jot down some suggestions for urgent conditions constantly arising in hospital work, which may be appropriate in this symposium on emergency:

*Burns.*—In severe burns anesthetize the patient at once with a few drops of chloroform before attempting to remove the clothing or to dress the wounds, and give a full dose of morphine hypodermically.

Stimulate with alcohol and strychnine and use other remedies for shock. Keep patient warm; do not expose him to draughts. Later, subcutaneous injections of sterile salt solution are valuable.

While the patient is anesthetized, bathe burns with weak corrosive sublimate (1:2000) or formaldehyde solution (1:1000), then wash with sterile salt solution or a sterile saturated solution of sodium bicarbonate, and dress with *dry* sterile gauze.

Burns of less severity should be treated in the same general manner, in order, if possible, to obtain a sterile wound which may heal without pus.

*Wounds.*—All wounds should be thoroughly cleansed and sterilized and dressed with dry sterile gauze.

If sterilization is difficult, general anesthesia by ether may be used to permit thorough scrubbing with soap and water followed by an antiseptic solution.

If for any reason anesthesia is not deemed wise, a gauze dressing wet with corrosive sublimate 1:1000, or formaldehyde solution 1:500, may be used if the wound is considered imperfectly sterilized. Undiluted benzine, tincture of iodine, or alcohol may be painted over the wound, if preferred, and a dry dressing applied.

*Gunshot Wounds.*—Do not use probe.

Sterilize the external wound and surrounding skin with soap and warm water, followed by corrosive sublimate solution 1:500, or formaldehyde solution 1:300, and apply a large dry sterile dressing.

*Crushed Limbs.*—*Never* put a tourniquet or rubber band around the thigh or arm at a considerable distance *above* the crushed tissues. The bleeding should be controlled at the injured region. Ligate the chief vessels in the crushed tissues or control them with hemostatic forceps, or put circular pressure with rubber band or muslin bandage at the crushed region and *immediately* above. Then only the already damaged structures are injured by the pressure.

Wash with corrosive sublimate solution 1:500, or formaldehyde solution 1:300, and wrap up the injured extremity in a large dressing wet with corrosive sublimate solution 1:1000, or formaldehyde solution 1:500.

Apply pressure by means of a firm bandage over the wounded structures, but not on the thigh or arm above, while awaiting amputation or other operative procedures.

While this is being done, use alcohol, whisky, digitalis, coffee, and nitroglycerin by mouth or rectum, and employ sterile saline solution under the skin or into the veins if necessary for shock. Morphine may be necessary to control pain.

Elevate the foot of the bed.

Apply heat to the patient externally.

*Injuries of Abdomen and Pelvis.*—Sterilize and dress wounds, but do not use probe.

Catheterize patient.

Do not give enema unless it is certain that there is no rupture of intestine or other hollow viscera.

*Lacerated Wounds of Fingers.*—Injured fingers should never be amputated simply because the soft parts have been scraped or cut away from the bone. Such fingers, denuded of the integument and muscles, may often be made useful members by thrusting them into a pocket made beneath the skin of the abdomen or thigh, and keeping them there with sutures for about two weeks. By such a plastic operation a cutaneous covering can be given to the denuded bones. To amputate them before endeavoring to cover them with integument in this manner is bad surgery in very many instances.

*Acute Abscess and Furuncle.*—A mistake often occurs in treating these conditions by plugging with iodoform gauze the incision made for evacuation of pus, with the idea

that drainage is necessary, and that this agent will drain the seat of pus.

The proper treatment is to make a free incision, not a small one, dress with gauze wet with a weak solution of mercuric bichloride or sterile salt, and cover the thick gauze dressing thoroughly with paraffin paper or rubber tissue. This impervious cover prevents evaporation and maintains the dampness of the gauze dressing until the next day.

Plugging the wound with gauze *will*, and even the insertion of a drainage tube or drainage rubber tissue may, after drying, cause pain by acting as a plug or cork in the wound. Tension is thus produced and the patient's condition made almost as painful as before the cut was made. Wise physicians, therefore, incise and dress with thick wet gauze, *covered with wax paper or rubber tissue,* all furuncles, carbuncles, and acute abscesses which they operate upon by incision.

All surgeons should know that gauze packing never drains pus. It may drain thin serous fluids.

*Lymphangitis and Lymphadenitis.* — These conditions, as a result of an infected wound in the vicinity or perhaps at a considerable distance distal to the affected area, are well treated by a thick gauze dressing moistened with a mild aseptic or antiseptic solution and covered with paraffin paper or rubber tissue. This dressing for twenty-four hours, with rest of the patient or part, will often relieve pain and lessen the inflammation in a manner to surprise those not familiar with surgical pathology. Many such cases are incorrectly supposed to be the condition formerly called erysipelas.

If improvement does not follow the continuous application of warmth, moisture, and rest, pus may be suspected; and incision will then be required.

*Open Fractures.*—Wash out fracture wound thoroughly with corrosive sublimate solution 1:500, formaldehyde solution 1:300, or undiluted tincture of iodine.

Sterilize surrounding skin for a considerable distance and apply a large dry dressing.

Adjust some form of retentive apparatus. A pillow tied around a leg makes a good emergency splint for fractured tibia or fibula.

*Fractures of the Skull and Brain Injuries.* —Elevate head of bed, unless shock is great.

Do not forget to have bladder emptied.

Give enema and active purgatives.

Shave head and sterilize wounds of scalp and apply large sterile dressing.

If there is suspected fracture of the base of the skull, sterilize the nostrils and external meatuses of the ears and plug with sterile gauze.

Examine with finger or probe for fracture of the skull.

Do not immediately adopt spinal puncture to establish the diagnosis of brain injury. Leave that for a later opportunity when sterilization of the back may be made perfect and other symptoms seem to render this usually innocuous operation desirable. If performed hastily or improperly it may do damage. It is often unnecessary.

*Fractures of the Upper and Lower Extremities.*—In these fractures it is dangerous to use adhesive plaster straps next to the skin or for holding splints in position, because often there is a good deal of swelling within the first few hours after the receipt of injury. A bandage should not be applied next to the skin, but the fracture dressings, if not contour splints of gypsum or metal, should be well padded with cotton and secured by a bandage on the outside. Thus the possibility of inflammatory swelling causing interference with the circulation is lessened. Fracture dressings should be carefully watched for twenty-four hours. Interference with circulation is shown by whiteness, blueness of fingers or toes, numbness, or perhaps great pain. Gangrene of the extremities is readily produced by tight bandages or pressure of splints or other mechanical obstruction to the return circulation through the veins. Within a month I have seen pressure sores, and strangulation of digits almost leading to gangrene, from badly applied fracture dressings.

*The Classic Fracture of the Lower End of the Radius.*—In the usual fracture at

this point the lower fragment is displaced backward. A splint should *never* be applied until sufficient force has been used to drive the lower fragment forward into its normal position. This causes a great deal of pain and requires considerable force on the part of the surgeon. As a rule, it is well to give a few whiffs of ether before reducing the fracture. This is to be accomplished by traction, counter-traction, and flexion of the wrist with *strong* pressure on the dorsal surface of the lower fragment. Sometimes strong hyperextension of the radius at the point of break is necessary to disentangle the impacted fragments. Afterwards the reduction is accomplished by flexion and pressure. The anesthesia need be carried only to the primary effect of the ether.

The arm and hand should then be placed in a molded gypsum or metal trough splint on the flexor surface, or a narrow straight wooden splint, or better a gypsum contour splint molded to the patient's arm, should be applied to the back of the wrist. Under no circumstances use a Bond splint, for this is liable to cause the lower fragment to be displaced again. I see fractures of this sort every winter which physicians, unfamiliar with this injury, have failed to reduce.

*Suspected Fractures of the Neck of the Femur.*—These injuries should not be subjected to *passive motion* or rigorous examination in the effort to make a diagnosis. The patient should be put to bed carefully and the limb supported by pillows until he is seen by a skilled surgeon. Much harm may be done by movements which tear the periosteum or separate the entangled fragments.

*Choking or Suffocation.*—Thrust finger down throat promptly, for often a foreign body or a mass of food will be unexpectedly found there.

These somewhat scrappy suggestions for surgical service of urgent cases indicate the kind of professional work thrown upon the resident physician in charge of the accident room of a metropolitan hospital.

Will any one contend that a youth of a few months' membership in the medical ranks is capable of wisely managing such emergencies? Assuredly not. Why then do hospitals allow accident cases to fall under his care, without providing a higher resident medical officer to be always at hand to guide and direct him? An experienced doctor with knowledge, and personal force, mental and administrative, should be employed to assemble information and symptoms and act as a competent consultant until a member of the attending medical staff can be obtained.

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## THE EXTERMINATION OF THE MOSQUITO.

The *Journal of the American Medical Association* of May 29, 1915, contains an article by Doty in which he claims there is no agent which may be used as a substitute for petroleum oil, for it acts quickly and is cheap and not dangerous. The latter is an important consideration, for if poisonous solutions are used—for instance, in pools in the country where animals have access—unpleasant results are apt to follow. Besides, larvæ are hardy little bodies, and not easily affected by poisonous agents. The writer's experience in this direction showed that larvæ will remain alive for over twenty-four hours in a 1:1500 solution of mercuric chloride, and a comparatively strong solution of phenol (carbolic acid) and other products which are often advocated for this purpose.

While petroleum oil is a valuable temporary agent in dealing with the inland mosquito, it is worthless in the destruction of the striped-legged or coast mosquito, chiefly on account of the great area involved, and must not be considered with this work.

The writer adds that after long personal experience in the extermination of both the inland and the coast mosquitoes, he has yet to know of any method by which this work may be successfully carried out except the destruction of breeding places. This is in full accord with the modern methods of preserving health; for it is the prevention of mosquitoes rather than their treatment that is called for.

# EDITORIAL.

## THE ACTION OF THE ALKALOIDS OF OPIUM UPON THE CORONARY CIRCULATION.

Several times during the last few years we have called attention to a number of researches along pharmacological lines which possess considerable interest and value, but which failed to possess the importance which might have been theirs had the investigators who published their results not been so dogmatic in the conclusions which they drew and so inclined to criticize the physician because his results in human beings did not agree with those which they obtained with animals in the laboratory. We have also on many occasions taken pains to point out that all of these researches are praiseworthy in that they add more or less to our knowledge of the action of remedies, and represent an important effort to clarify the application of drugs in the treatment of disease.

In some instances the methods employed are so far removed from any resemblance to conditions which exist in bedside therapeutics that they may be considered mere contributions to our knowledge of what happens when a substance *a* comes in contact with another substance *b*. In other instances the results which bear more directly upon clinical therapeutics give us only sufficient information to permit us to guess at what the results would be if the same technique was followed in human beings, and in still a third class of investigations a very considerable amount of light is thrown upon obscure problems in therapy, although the methods of experimentation may be, of necessity, far removed from those which could be employed by the active practitioner. As illustrative of this kind of research we have the explanation of the benefit which is received by a large number of asthmatics when a hypodermic injection of 5 to 10 minims of 1-to-1000 adrenalin solution is given. As in so many instances, this employment of adrenalin was discovered by accident and its use was for some time empirical, until Wiggers and others showed that while adrenalin contracted the muscular fibers of the vascular system it relaxed the muscular fibers of the bronchioles, and so gives relief in this distressing state.

There has recently appeared another research, which, while carried out upon tissues removed from living animals and kept alive by artificial methods, nevertheless enables us to take a step forward in our knowledge of the value of opium and its alkaloids in certain alarming conditions of the circulatory system. The research to which we refer was made by Macht, in which he studied the effect of these alkaloids on the excised coronary arteries of the pig. His research was based, so far as its clinical aspects are concerned, upon the generally recognized fact among medical men that in certain cases of ruptured compensation due to valvular disease a hypodermic injection of morphine sometimes would produce favorable results which no other drug, not even digitalis or strophanthus, could induce. It has also been shown that a hypodermic injection of morphine in angina pectoris often seems to do good, not alone because it relieves the pain, but also because the condition of the circulation is materially improved. Very frequently it is used in that form of this disease which is known as *angina sine dolore* with excellent results. It has long been taught by physicians of experience that true angina is associated with more or less spasm of the coronary arteries; this spasm in many cases being associated with much thickening of the walls as a result of fibrosis. For this reason it has been thought that the good results which often follow the administration of nitroglycerin hypodermically are due to relaxation of coronary spasm. Macht seems to have proved that morphine produces a mild dilatation of the coronaries, although he points out that if the alkaloid narcotine or papaverine is given this dilatation is very much more marked.

Codeine, on the other hand, had a very slight effect upon the coronaries, and the other opium alkaloids, narceine and thebaine, no effect at all.

As a matter of fact narcotine and papaverine are not generally found upon the market, and our knowledge concerning them, from the clinical standpoint, is so meager that there is little likelihood of any demand for their preparation for the use of physicians, the more so as narcotine is supposed to be largely responsible for the depression and nausea which not infrequently follow the use of opium. It would appear, however, from this research, that in those cases in which the attack of angina is not exceedingly severe, so as to demand relief by hypodermic injection, better results will be obtained, in cases which last for a number of hours or days, by the administration of some preparation of opium itself, avoiding, however, denarcotized opium or the deodorized tincture, since from them the narcotine has been deliberately removed, using ordinary tincture, the fluid extract, or opium itself. Even if we could obtain narcotine readily, in order to have it exercise its effect upon the coronary vessel, it probably would not meet the indications present, since it seems to have little power to relieve pain.

Macht's research is another interesting illustration of the simile used by Sir Clifford Allbutt when he said that the pharmacologist resembled the cartographer in his relation to the pioneer; meaning by this that the clinician was, as a rule, a pioneer going out into an unknown country proving its value and being followed by the cartographer, who put the country on the map in an accurate, scientific manner.

There are comparatively few instances in medicine in which a drug has come into general and continued use because of laboratory investigations. The only three that occur to us at the moment are the use of the nitrites, as originally suggested by Brunton; the use of urotropin; and the development of salvarsan. To this list might be added some of the newer hypnotics, but it still remains a fact that most of our useful drugs have obtained their place as the result of clinical study, and the explanation of their value has often followed many years later, as in the research of Macht just quoted.

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## THE VALUE OF SALICYLATES IN ARTHRITIS.

For a number of years articles have appeared in some of the medical publications of this country in which laboratory studies have been reported which seem to contradict our conception of the action of certain drugs when employed at the bedside. We have, on more than one occasion, drawn attention to such articles, being unable to explain the lack of coördination between clinical observation and laboratory research in some instances, whereas in other cases this coördination has been by no means so difficult. Not infrequently, as we have also pointed out in other leading articles, the laboratory investigator has proved that our conception of the manner in which a drug acts is erroneous without in any way proving that its employment is useless. In other words, the observation on the part of the clinician that a certain remedy is of value to meet a given condition is not proved incorrect, but his interpretation of the manner in which the drug acts is proved to be erroneous. In some instances, however, observations in the laboratory exactly coincide with observations at the bedside, and as a rule the observation at the bedside has been made first and the study in the laboratory, which proves its correctness from a scientific standpoint, is carried out many years later, as has been noted in the preceding article. An illustration of this is found in the *Archives of Internal Medicine* of April 15, 1915, in an article prepared by D. J. Davis on the "Effects of Sodium Salicylate on Various Types of Experimental Arthritis."

It has long been known to practitioners, who are well versed in the pursuit of their calling, that the salicylates are entirely useless in gonorrheal rheumatism, and that this statement may be extended still further to any form of so-called rheumatism or

arthritis which is not due to the specific microörganism of Poynton and Payne. It is, therefore, of great importance when the physician meets with a single or multiple, acute or subacute arthritis for him to make a differential diagnosis between true acute articular rheumatism and the other forms of infectious arthritis, because for the former he has in the salicylates a remedy which, so far as drugs are concerned, may be fairly considered at least somewhat specific in its effects, whereas, if the arthritis is due to other microörganisms, large doses of the salicylates are not only useless, but produce disagreeable symptoms and disorder digestion.

Another fact long recognized by men possessing adequate clinical experience, which we emphasized many years ago in the columns of the GAZETTE, is that the free administration of the salicylates in no way protects the endocardium during the course of acute articular rheumatism, except that by shortening the attack or diminishing the duration of the infection the salicylates thereby diminish the period during which the endocardium and myocardium are exposed to the infectious process.

It is interesting to note that in the investigations of Dr. Davis, to which we have already referred, these clinical observations have been confirmed, although it is also important to observe that his conclusions are based upon the inoculation of a comparatively small number of rabbits with various strains of streptococci. The results in such experiments are, of course, to be given little weight if they oppose clinical observation based upon the almost universal experience of physicians. Dr. Davis found that the administration of sodium salicylate does not exert a favorable effect on infections in rabbits caused by different strains of streptococci, even in instances in which the salicylates were administered some hours before inoculation was practiced, and, furthermore, he found that the salicylates did not prevent localization of the organisms in the joints, nor did they prevent the appearance of endocarditis. His conclusions, therefore, are in accord with the clinical results already arrived at that the salicylates have neither prophylactic nor curative value in forms of septic arthritis.

The doses Davis employed were certainly sufficiently large to be therapeutically active, if the drug possessed any value, since they were equivalent to about 250 grains of salicylate of sodium to a man weighing 150 pounds.

Investigation as to the means by which salicylates modify the joint manifestations in acute articular rheumatism is by no means far advanced. It is a subject almost as unknown as the method by which mercury does good in syphilis. At one time the belief was prevalent that salicylates did good in that they combine with uric acid and render it easy of elimination. This theory was popular at the time that rheumatism was supposed to be due to an excess of uric acid in the joints or fluids of the body. It fell from its high place when the infectious nature of the disease was discovered, and those who favored this view then claimed that the salicylates did good not because they removed the uric acid which was the cause of the malady, but that they did good because they got rid of the uric acid which was the result of the malady. At the present time we believe that the general opinion is that the salicylates exercise an antiseptic or destructive influence upon the specific microörganism of acute articular rheumatism, but we are not familiar with any investigations that indicate the correctness of this view beyond doubt.

## DIPHTHERIA AND THE SO-CALLED SCHICK REACTION.

It has been known to active clinicians and laboratory workers for quite a long period of time, that certain persons who receive the microörganisms of diphtheria speedily develop that malady in varying forms of virulence. On the other hand a by no means small number of persons are able not only to receive but to carry about in the pharynx, in the tonsils, or in the post-nasal spaces, a multitude of these specific microörganisms without at any time suffering from the slightest degree of discomfort and illness, being at all times

unconscious of their infection. These individuals are, however, quite as capable of spreading the disease as are those who have definite clinical manifestations with a false membrane present. These so-called immune persons are doubtless responsible for the development of diphtheria in cases in which all of the ordinary methods of infection seem to have been excluded. Such facts have, at first sight, little bearing upon the problems which confront the active practitioner, who naturally is not called upon to see the diphtheria carrier who has no symptoms and so has no opportunity of attacking the disease in its primary focus. The only way in which he can actively control the spread of diphtheria by such carriers is to insist upon all persons who have been exposed to this disease receiving antitoxin or being locally treated in such a way that the focus of infection is removed. In other words, when an individual has been in charge of or is nursing a case of diphtheria, yet presents no evidences of the disease, the proper thing to do is to investigate the case to find if the nurse's throat is negative as to infection, and if not to see that it is made negative.

Another reason why certain patients develop diphtheria while others equally exposed escape, lies in the fact that one individual contains in his body a considerable amount of antitoxin, whereas another individual, seemingly equally healthy, has a minimum amount of this valuable protective substance. In other words, it is perfectly possible for two people apparently in perfect health and equal strength to be exposed to diphtheria, one being stricken, the other escaping. The interesting point for the clinician is to determine which one will be stricken and which one will escape. This is of particular interest to him when the somewhat remote danger of anaphylaxis is considered, and still more so when he is called upon to determine as to the wisdom of administering diphtheria antitoxin to a large number of individuals in a family, the members of which have been exposed; or to the still larger number of individuals in an institution where the malady threatens to run riot.

For many months past evidence has constantly been accruing to the effect that it is possible for us to determine which patient needs antitoxin and which patient does not need antitoxin, and this is done by a test closely allied in its nature to the so-called von Pirquet reaction, or test, introduced by that clinician. The test consists in introducing into the skin itself, not subcutaneously, by means of a sharp-pointed fine needle a minute amount of standard diphtheria toxin, not antitoxin, which is diluted, and which contains 0.5 per cent carbolic acid to preserve it. This standard solution or mixture of diphtheria toxin when about to be used is diluted still further by normal salt solution so that 0.2 Cc. contains 1/50 of the minimum lethal dose for a guinea-pig of 250 grammes. The injection is usually given upon the flexor portion of the arm or forearm. The reaction which it induces varies considerably in different individuals. If the part so treated develops a definite, well-marked hyperemia, or redness. this indicates that the patient possesses very little if any diphtheria antitoxin; a fainter reaction shows that there is more diphtheria antitoxin present; and if there is no reaction the patient can be considered immune for at least a time. Schick, who brought forward this test, claims that about 1/30 of a unit of antitoxin is present in each cubic centimeter of the patient's blood to render this test negative; or, in other words, to indicate that the patient is so immune that after exposure to the disease an injection of antitoxin is not required. Naturally such a test in orphan asylums when properly applied possesses not only a humane but a pecuniary value which is most important.

It is interesting to note that not only do certain individuals vary greatly in their reaction to the Schick test, but that groups of persons forming families vary as groups. Park states that where there are a number of children in a family and the youngest child gives a negative reaction, or in other words is not susceptible to the disease, a test of the older children usually shows that the same immunity has been conferred upon them; whereas if the older children

give positive tests the younger ones are very apt to do likewise.

Two other points are of interest in this connection: One is that a positive reaction when it develops usually comes on in twenty-four hours, and the part is not only red, or hyperemic, but slightly indurated. This condition increases in these characteristics for twenty-four hours more, continues for a week to ten days, and undergoes a gradual involution and leaves behind a brownish discoloration of the skin with some scaliness which may not disappear for twenty-one days from the time of the infection. Occasionally patients present a so-called pseudoreaction, the condition apparently being due to hypersensitiveness of the skin rather than to any susceptibility to diphtheria.

Lastly, this test has proved of interest in that it has thrown some light upon the period of life at which human beings are most susceptible to diphtheria. Various statistics seem to indicate that this period is between the first and sixth year. Some years ago the writer of this editorial published a chart based on 3360 cases collected from various sources which showed that the greatest incidence of diphtheria was between two and five years, and the Schick test applied to many hundred children indicates also that this is the period when a positive reaction most commonly develops.

## TRANSFUSION OF BLOOD.

Because of the greatly simplified technique and the, at least theoretical, advantages which have seemed to accrue from blood transfusion, this procedure has been one of wide use, much wider than current literature would lead one to suppose, nor has the profession at large definitely and clearly determined the indications for this therapeutic agency, the results which may be expected from it, or the dangers attendant upon its use. The paper of Ottenberg and Libman (*American Journal of the Medical Sciences,* July, 1915) is therefore of distinct service, noting as it does that the tests for agglutination and hemolysis between blood of donor and of patient are reliable. The dangers of excessive transfusion can be easily avoided. Basing their study on 212 transfusions, there were 42 cases in which this treatment saved life. Of these 29 recovered entirely and were discharged well. Thirteen were saved from immediate death, but continued to suffer from some chronic condition which could not be cured by transfusion, such as pernicious anemia, leukemia, etc. Nearly all the 29 rescued from immediate death were cases of hemorrhage.

The cases in which transfusion was apparently life-saving were instances of acute anemia from hemorrhage, hemorrhagic diathesis, whether hereditary or acquired, grave chronic anemias, and poisoning. There were 43 cases cured or greatly benefited, but not in desperate condition at the time of transfusion. These were patients whose general condition had been seriously impaired by chronic disease. Most of them ultimately made complete recoveries.

There were 104 cases in which transfusion did no good. There is a first group of 28 cases which improved for a short time, but died subsequently from continuation of the original disease. These included a considerable variety of diseases, chief among which were malignant tumors, pernicious anemia, subacute streptococcus endocarditis, dysentery, typhoid fever, and pyogenic infections. These were all cases which lived from several days to one and a half years after transfusion.

The second group of the patients who died consisted of 23 cases of some disease of itself so grave that transfusion could not have been expected to do much good, and was only resorted to as a desperate hope. These included a great variety of pathological conditions ranging from typhoid perforation to hemorrhagic diphtheria, diabetic coma, and purpura hemorrhagica. There were also three cases of hemorrhage in typhoid fever.

Concerning transfusion for simple hemorrhage, there can be no doubt as to the life-saving power of the method. It not only supplies the lost blood, but checks continuance of the bleeding. Indeed the authors

have advised that in all typhoid cases the first appearance of blood in the stools should be an indication to make preparations so that a transfusion can be done, if needed, at very short notice.

As preliminary to surgical operation there were 33 preoperative transfusions, in 13 of which the result was decisive and the patient recovered.

For shock there were seven transfusions. All the patients died within an hour to five days, from which the authors have deduced the conclusion that transfusion is not to be relied upon as a remedy for pure shock. These transfusions were all done late.

Concerning the cure of hemorrhagic conditions, for typical purpura hemorrhagica in which the number of blood-plates is greatly decreased, but the coagulation of the blood is generally unimpaired, there were twelve transfusions in nine cases. Two died, seven recovered. In four of these cases the cessation of hemorrhage was prompt and complete; in the other three the cessation of hemorrhage after transfusion was not complete.

Concerning hemophilia, transfusion may be fairly spoken of as specific therapy. It supplies the patient's blood with the element lacking for the production of coagulation. In five out of six hemophilics transfusion checked the hemorrhage promptly and the patients regained good health. It is suggested that every individual known to have hemophilia ought to have at command several persons whose blood by previous tests is known to be compatible with his, and who are willing when called upon to give blood for transfusion. Thus it may be made possible for the majority of hemophilics to lead a life of normal duration. The prophylactic effect of small transfusions (25 to 50 Cc.) repeated at long intervals (one to three months) is warmly commended.

Concerning the use of serum in hemorrhage cases, in spite of the occasional cessation of bleeding after such injections Ottenberg and Libman have not been able to convince themselves that this agent has any effect. Indeed in two hemophilic cases not transfused the coagulation time was no shorter than before serum injections. Serum applied locally to small bleeding points, or defibrinated blood, has undoubtedly a distinct hemostatic action.

As to secondary hemorrhagic diseases—*i.e.*, those incident to severe infections, pernicious anemia, and intoxications—transfusion may check the hemorrhage, but will not necessarily cure the disease. There were 13 transfusions in 12 cases of prolonged obstructive jaundice. The result seems to show that postoperative hemorrhage due to cholemia is as a rule not checked by transfusion, and moreover precautionary transfusion before operation may fail to prevent the postoperative hemorrhage.

In 35 transfusions in 25 cases of undoubted pernicious anemia there were no cures and 14 remissions. Transfusion is never curative in pernicious anemia, but it is the best remedy for the disease and leads to remissions in about one-half the cases.

Upon chronic lymphatic leukemia it does exert an influence, especially if repeated. In prolonged infections the authors hold that the transfusion of normal blood may be extremely valuable and should not be too long delayed. In acute poisoning transfusion would only seem to be indicated when a considerable part of the poisoning is contained in or has acted upon the blood. Among poisons which act in this way are carbon monoxide, hydrocyanic acid, benzol, nitrobenzol, and possibly carbolic acid. In such cases, of course, a large phlebotomy must be done before or during the transfusion.

As to the dangers of the method of transfusion, hemolysis or agglutination of the red blood cells of either donor or patient can be excluded by previous laboratory tests. The donor should be free of syphilis and tuberculosis, and big and strong, though not fat. As for the technique the authors prefer the syringe method. For the repair of hemorrhage less blood suffices than that which was lost. In hemorrhagic diseases a relatively small transfusion (500 Cc. for an adult) is usually large enough unless the amount of blood already lost has been very large. For pernicious anemia

500 to 1000 Cc. is enough. In the various forms of poisoning, especially in gas poisoning, a large phlebotomy followed by a very large transfusion would seem to be indicated. In chronic conditions it is undoubted that transfusion is desirable.

From the surgeon's standpoint transfusion seems clearly serviceable for one condition—that is, hemorrhage.

## THE INCISION OF TUMORS FOR DIAGNOSIS.

Under this title Ewing (*New York Medical Journal,* July 3, 1915), who happily combines technical knowledge of the highest type with clinical observation and sound common sense, makes some comments worthy of careful consideration.

In typical cases the distinction between malignant and benign growths can be made from the history when the patient comes late, and should be made by complete removal and microscopic examination when the patient comes early and such operation is neither formidable in its extent, nor crippling nor deforming in its effect.

There are, however, many instances in which the diagnosis is uncertain, in which a complete and wide removal implies at the least an extensive mutilation, and in which the easy method of removal of a portion of the growth or tumor would seem to be indicated.

Ewing states that the essential basis of the competent treatment of malignant tumors is a full knowledge of their point of origin, their pathological nature, and their natural history. As this knowledge becomes more and more comprehensive each malignant tumor assumes the character of a specific disease. Thus one must distinguish between rodent ulcer of the skin and epidermoid carcinoma of the tongue just as sharply as between eczema and psoriasis. Both these tumors are carcinomas of the surface epithelium, but they arise under wholly different conditions, pursue divergent courses, and present quite different therapeutic problems.

To announce a tumor as simple carcinoma or sarcoma may be without any practical meaning whatever, since some processes to which these terms are attached are benign and self-limited. Others are malignant and invariably fatal.

The tissue of origin is a matter of importance. Thus periosteal sarcoma is far more formidable than a benign epulus. Giant-cell sarcoma of the tendon sheaths is a benign process, whereas giant-cell periosteal sarcoma arising in the same region is a highly malignant and dangerous disease. So definite and decisive is the evidence furnished in many instances by microscopical study that the practice of resting the diagnosis on microscopical criteria has become practically universal. The microscopical study, however, should be an extended one and should have for its purpose the determination of the exact origin, nature, and probable course of the process in hand.

Concerning the indications for a microscopical study of tumors before operation, Ewing holds that the careful excision of a small piece of malignant tumor by a sharp scalpel need not as a rule tend to disseminate or aggravate the disease. Nor has he observed any unfortunate results in superficial tumors, and greatly doubts that clinical observation will substantiate this claim.

It is, however, true that incision through the unbroken skin is seldom admissible for the sake of diagnosis. The skin is the chief protective against infection, which, when once established in a tumor, greatly aggravates the disease. It is especially to be avoided with sarcomas of bones, muscle, and fasciæ, tumors of the breast, and in all growths in which incision of the skin involves also incision through a tumor capsule. In all such cases it is better to remove the entire tumor by an incision which permits of enlargement for a more extensive operation. Particularly unfortunate results may follow when an incision of the skin is followed by a deep dissection in the effort to reach an ill-defined and inaccessible tumor. In such cases one may fail to secure a portion of the tumor and may submit for examination a portion of the inflamed surrounding tissue; the tumor tissue is often crushed beyond recognition.

There is an exception to this rule, since in tumors of the lymph nodes there is no way of establishing the diagnosis of Hodgkin's granuloma, lymphosarcoma, or endothelioma, except by examination of an excised lymph node, nor are there any unpleasant results from such procedure. Incision into an infiltrating lymphosarcoma must be avoided under all circumstances and a correct clinical history is essential. The prognosis of a tumor may to a considerable extent be based on the microscopic structure. There are instances in which such a prognosis is possible, and among them Ewing mentions Hodgkin's granuloma, malignant lymphosarcoma, chorio-carcinoma, embryonal carcinoma of the testis, carcinoma of thyroid, osteogenic sarcoma of humerus, femur, or trunk, and many other tumors of which the prognosis is practically fatal.

In another group of cases the potential malignancy of the tumor may be judged with much accuracy from the histological structure, whilst its actual clinical course may be subject to wide variations. In mammary cancer, for example, it is highly important to distinguish between comparatively benign papillary adenocarcinoma, which carries a good prognosis, and true alveolar carcinoma, which in young subjects is nearly always fatal.

The use of frozen sections, while occasionally of decisive value, encourages hasty conclusions and readily leads to error. In operations upon the breast it is very prone to mislead. It should be replaced by the gross examination of the whole tumor, which in the great majority of cases yields signs of malignancy, or benign qualities which are quite as conclusive as are microscopic pictures. Most pathologists who are frequently called upon for frozen sections make their diagnosis on the gross appearance of the tissue and use the frozen section for confirmation. Where the macroscopic examination leaves doubt, the frozen section usually strengthens the doubt. In the absence of wholly characteristic clinical and gross anatomical signs of malignancy it is unwise to risk the sacrifice of important structures, such as half of the tongue or a limb, without resorting to microscopic section. With the modern improvements in technique the frozen section often furnishes a prompt and trustworthy decision, but when the structure of the tumor is atypical, more time should be given for a deliberate study.

No rigid rules can be safely followed in deciding when to remove a portion of a tumor for diagnosis. The conditions surrounding the growth of tumors are so variable that each tissue and organ must be considered by itself. Ewing states that in general the attitude regarding the probatory incision of tumors should be conservative. The resort to this method of diagnosis is a confession of ignorance. The extent to which it must be employed depends on the experience and diagnostic capacity of the observer. It is possible by long training to recognize the nature of most accessible tumors by various clinical signs, and the hasty resort to microscopic diagnosis tends to hamper the development of other diagnostic methods and of general clinical judgment. In not a few instances the clinical signs are more specific than the microscopical structure of a tissue section. The microscope should be employed, therefore, only after other means have failed.

Having failed by other methods to establish a diagnosis, the wisdom of resorting to probatory incision must be determined for each particular case. There will always remain a large number of conditions in which the fullest possible clinical analysis leaves doubt of the nature of the disease, and when important variations in treatment may depend on positive diagnosis; then the microscopic evidence must be invoked.

The wisdom of removing tissues for diagnosis may often depend on the possibility of securing a competent pathological report. The assumption that any laboratory tyro who cuts sections in a chemical, bacterial, or commercial laboratory, or a drug store, is a competent judge of histopathology, appears to be widely held. Yet any surgeon who fails to investigate the technical standards of the laboratory where he sends material, and the competency of the examiner who passes upon it,

fails in his duty to his patient. Ewing believes that all general pathologists will support the assertion that the histological interpretation of tumors is a very extensive and difficult medical specialty, requiring a mature knowledge of general pathology and a long practical experience with tumor tissues.

Finally, the restrictions here suggested in the use of probatory excisions of tumors do not in any way apply to the thorough study of the tumor after operation. With the whole material in hand it is difficult to place any limit to the scope of the examination desirable or to the importance of the conclusions thus reached in determining the diagnosis, prognosis, and further treatment of the case. It cannot be too strongly emphasized that the scope of this study must include, not only the microscopical structure, but also the gross anatomical features and the complete clinical record.

# REPORTS ON THERAPEUTIC PROGRESS.

## PITUITARY EXTRACT IN OBSTETRICS.

QUIGLEY in the *Journal of the American Medical Association* of April 10, 1915, writes as follows:

"Throw away your forceps and use pituitrin" is the glowing headline of a recent advertisement of a large pharmaceutic concern. An enthusiastic obstetrician, in prefacing a report on its use, says: "Since the introduction of the antiseptic method in obstetrics by Semmelweis and Oliver Wendell Holmes in the early forties, nothing has had such a far-reaching effect on the practice of midwifery as the use of pituitary extract."

While both these laudatory expressions are, to say the least, slightly extravagant, nevertheless pituitary extract is here to stay in the armamentarium of the obstetrician.

The literature on the use of extract of the hypophysis as an oxytocic dates from Blair Bell's paper, read before the Liverpool Medical Institute, November 4, 1909 (just five years ago). For the next three years its practical application was worked out largely by German and Austrian observers, and the German literature was voluminous. During the past two years many Americans have written on its use. The striking feature of all these reports is the unanimity of opinion as to its value and the almost total lack of untoward results, when used within its limitations.

In this brief paper the writer wishes to supplement a more detailed review of the literature and report of twenty-six cases already made, so he omits any extensive quotations. Since that report he has used pituitary extract in twenty-four additional cases.

The physiologic action of extract of the hypophysis as an oxytocic is limited to the extract of the posterior lobe of the gland. From this, quite recently, have been isolated eight constituents, four of which, precipitated by phosphotungstic acid, can be separated from one another by fractional precipitation. These four principles differ in their action on the uterus, blood-pressure, and respiration. Number 4, for instance, has marked oxytocic properties, but no action on the blood-pressure or respiration.

The pituitary hypertrophies during pregnancy to a marked degree—often to twice its normal size. In view of the marked effect of extracts of this gland on the pregnant uterus, what effect, if any, does the secretion of the hypophysis have on the inception or origin of labor pains and on their continuance?

What effect would extirpation of the posterior lobe have on labor in a pregnant animal?

Pituitary extract given per os is practically inert, but given subcutaneously or intramuscularly its effects are noted in from three to ten minutes in a marked increase in the intensity and duration of the pains. This action continues for from sixty to ninety minutes. It shortens the third stage

considerably—in the writer's series by one-half. It is a prophylactic against vesical atony, so catheterization is rarely necessary post partum. It is a temporary galactagogue. It is non-toxic and non-cumulative. There are eight preparations on the market: two American, one English, and five German. The writer has used one of these, namely, that of Parke, Davis & Company, in the most of his work, and the pituitary extract made by Burroughs Wellcome Company and by Farbwerke Hoechst, to a lesser extent.

The original preparation was marketed in ounce bottles and was unstable from deterioration, so that now it is put up in ampoules exclusively for hypodermic medication. One Cc. equals 0.2 gramme of dried substance. The earlier doses were unnecessarily large, some using as high as 4 Cc. as an initial dose. The writer has never used more than 1 Cc., and during the past year has found that ½ Cc. seemed quite as efficient.

If no result is seen in one-half hour, repeat the dose, using 1 Cc. at the second injection. If no response follows this second dose, one may conclude that the use of the agent in that particular case is a failure.

The writer wishes to take exception here to the statement of Druskin in his paper: "The use of the drug is remarkably free from danger even when given in enormous doses."

Quigley gives the following indications for the use of this substance:

*Uterine Inertia.*—This in the second stage of labor is the ideal condition for the exhibition of pituitary extract, meaning a fully dilated or dilatable os, a presenting part that is engaged, or can be made to engage, and absence of obstruction either on the part of the passage or passenger. Often, to be sure, in multiparæ we find the head unengaged with unruptured membranes and a big pelvis. Here its use is admissible, but an engaged presenting part with full dilatation is the safest working rule.

*Placenta Prævia Lateralis.*—Pituitary extract should be used either after rupture of membranes and intraovular use of a Voorhees bag or without the bag.

*Postpartum Hemorrhage.*—In this condition its action is more prompt and energetic, but not so prolonged as ergot. Hence it is well to supplement it with the use of the latter drug.

*Cæsarian Section.*—Here it should be given at the time of the uterine incision. It is more prompt and certain than ergot.

*As a Galactagogue.*—Hill and Simpson of Ithaca, writing in the *American Journal of Physiology,* claim an increase in the mammary secretion in a case in the fifth month of lactation with higher percentage of fat. The amount obtainable on the next morning was diminished, however. The writer has used it twice during the first three weeks of lactation, with a temporary improvement only. (See GAZETTE for May, 1915; article by Hughes.)

*Induction of Labor.*—Pituitary extract will not induce abortion or premature labor (fortunately). Used in conjunction with dilating bags or the cervical pack, however, or in a case of inevitable or incomplete abortion, it is a valuable aid.

*Late Puerperal Metrorrhagia.*—One instructive case was that of a woman in her fourth puerperium with a history of severe bleeding at the sixth week post partum in two previous instances, which demanded rest in bed and, in one case, curettement. In this instance she was given 1 Cc. of pituitary extract on the eleventh, twelfth, thirteenth, fifteenth, and eighteenth, with marked improvement after the first dose, and a cessation of bleeding after the fourth dose on the fifteenth. It was not necessary to put her to bed at any time.

Quigley believes the contraindications to be as follows:

First, last and all the time, obstruction, as contracted pelvis, an occiput posterior stationary at the brim, etc. It is not to be used to hurry a case making normal progress, or when the cervix is not taken up; in the presence of marked high blood-pressure, or if the fetal heart is unusually slow.

Now as to the objections to its use mentioned by a few observers:

1. Asphyxia neonatorum. The children delivered after the use of pituitary extract commenced breathing as quickly as the average, and no true asphyxia was noted in the cases the writer has seen.

2. Tetanic contractions. Pituitary extract is undoubtedly the most active oxytocic agent known. It does increase the intensity and length of the pains and shortens the intervals, but the writer has never seen a true tetany develop.

3. Postpartum relaxation. Three of his patients had quite a bit more of bleeding after the third stage than is usually seen, but nothing approaching a flooding or that did not respond to simple measures for its relief. If pituitary extract is administered over an hour before expulsion, the administration of the usual drachm of ergot will obviate this danger, he thinks. It should not be used unless the patient can be under supervision for from one and one-half to two hours post partum.

4. Uterine rupture. This, to the writer's mind, is the greatest danger confronting us in the use of pituitary extract, and, at the same time, the easiest of prevention. Some four or five cases have been reported to date. A patient sent to Polak's clinic, Brooklyn, had had 4 Cc. as an initial dose. In a case reported by Druskin of New York, the patient, who had an acute nephritis, had been in labor only three and one-half hours and was making good progress, with strong, regular pains, when 1 Cc. pituitary extract was given with the head at the inlet. Symptoms of rupture supervened in about an hour and a half. Herz of Leipzig, in 1913, reported a case of uterine rupture following administration of 1 Cc. to a delicate anemic primipara two days in labor with cervix dilated only two fingerbreadths, with a flat rachitic pelvis and outward bulging of the lower uterine segment. It would seem that no comments on this case are necessary.

The writer cites these three cases, first, to show that pituitary extract is a violent stimulant to uterine contractions, that it must not be used except when indicated, and that it must be used with discretion; secondly, to show that in the three cases the details of which are available it was not used with judgment, but, on the contrary, quite recklessly.

Quigley summarizes his views as follows:

1. In pituitary extract we have the most powerful stimulant to uterine contraction yet discovered.

2. Its greatest value is its use in uterine inertia.

3. The ideal time for its exhibition is in the second stage, although good results follow its employment earlier; in these cases it is usually necessary to repeat.

4. No untoward results, such as postpartum hemorrhage or asphyxia, were noted for mother or child in fifty cases.

5. It shortens the third stage.

6. It renders catheterization post partum almost never necessary.

7. It has no place in the normal case.

8. Preparations for delivery should be made at time of injection, such as sterilizing hands and gloves.

9. The facilities for giving an anesthetic at a moment's notice are prerequisite, for we do not know the susceptibility of the uterine muscle in any particular case.

10. Pituitary extract may advantageously be supplemented by seminarcosis when the presenting part is on the perineum. (This would naturally mean chloroform, ether, or pituitary extract. Nitrous oxide is contraindicated in scopolamine narcosis.)

11. Pituitary extract must be used judiciously and with a due appreciation of the possible dangers of so powerful a uterine stimulant. This is the most important point.

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## DIET IN TYPHOID IN INFANTS AND YOUNG CHILDREN.

In the *American Journal of Diseases of Children* for May, 1915, La Fetra and Schroeder reach these conclusions:

1. It is possible, in the great majority of cases, to feed children suffering from typhoid fever, even during the febrile period, with an amount of food furnishing sufficient calories to maintain or even increase body weight.

2. This high caloric diet, besides prevent-

ing the emaciation usual in this disease, greatly increases the comfort of the patient, prevents the severe nervous symptoms, and lessens the dangers of the disease and of its complications.

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### THE RELATIVE FREQUENCY OF THE MORPHINE AND HEROIN HABITS.

FARR in the *New York Medical Journal* of May 1, 1915, says it is beside his purpose to go into a detailed account of the symptoms and treatment of morphinism and heroinism. He confines himself to a few impressions based upon the statements of patients. When heroin is taken for the first time by insufflation, there is a pleasant sense of exhilaration and self-satisfaction, which gives way to sleepiness if the snuffing is repeated. After a very brief period of addiction, the user ceases to enjoy this blissful state and is lucky if, after his usual dose, he can regain even a normal sense of well-being and energy. Very soon he begins to suffer from the habit, or, as opium smokers call it, "yenyen." He awakes in the morning with a sense of utter listlessness and lack of ambition, accompanied by yawning or gaping. Without his usual snuff he feels that he cannot get up and go to his work, but as soon as he gets it he is immediately restored. Later in the day the craving returns and is satisfied in the same manner. If the victim is unable to get the drug, nausea, vomiting, at first of mucus and later of green fluid, pain in the stomach, colic, diarrhea, restlessness, insomnia, pains in the limbs, chills, sweats, feeble pulse, and all the other symptoms of deprivation so familiar in morphine cases, make their appearance. As a rule the withdrawal symptoms are not so severe in heroin as in morphine habitués, but the difference is one of degree rather than of character. If the withdrawal is immediate, these symptoms are intense for several days, but then clear up, leaving the patient weak and devoid of appetite. Very soon, however, the appetite becomes ravenous, and the weight, which has fallen off markedly, is rapidly regained. All his patients who employed cocaine agreed that it did not produce a habit in their acceptation of the term. Briefly stated, the heroin addiction is a negative pleasure; the cocaine, a positive one.

The literature of the heroin habit is not an extensive one if we omit the newspaper vaporings of the last few months. It is divided into two distinct categories: (1) The literature of the heroin habit, as produced by the indiscriminate use of the new drug by the profession some ten or twelve years ago; (2) the use of the drug as a pure luxury during the last five years. The first category, not being germane to the subject, may be discussed in a few words. The second, for lack of material, may be briefer still. Heroin (diacetyl-morphine-hydrochloride) was introduced into practice about 1898, and was recommended for the relief of pain, and particularly for pathological respiratory conditions (cough and dyspnea). It was repeatedly emphasized by reporters that it was not a habit-producing drug, and in France it was lauded as a cure for the morphine habit. As a result, Pettey, of Memphis, was able in 1903 to report eight cases of addiction traceable to physicians. In these cases the drug was taken by mouth or hypodermically. In the same year cases were reported from Paris by Manquat and Blondell, and in subsequent years by Comar and Buvat, Duhem, and others. In 1911, Brooks and Mixell in the United States, and Symes in England, drew attention to the subject. The cases seen by the first-named authors had acquired the habit from the use of cough mixtures. Phillips, in 1912, so far as the writer can discover, was the first medical writer to describe the snuffing habit as it then existed in the tenderloins of the Middle West. Blanchard, in 1913, was the first to notice the prevalence of the habit among soldiers, to whom it was known as "happy dust." Other references of minor importance occur in very recent medical literature.

The writer's conclusions from a study of many cases as to the cause of the sudden and appalling increase in the heroin habit are as follows:

The severe laws enacted against cocaine

two or three years ago favored the introduction of a drug which might be taken in the same way, either with or without the cocaine. In the former case it tended to overcome some of the unpleasant features of the cocaine habit.

The suppression of opium dens by the police had a similar though a less marked effect.

Those addicted to the drug seemed to have a proselytizing zeal which is difficult to account for, except in the case of those who were venders.

The psychology of the "quarter" and the peculiar ideas of "habit" persuaded many persons that they had an addiction when they clearly had not as yet acquired it.

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**CARE OF PROSPECTIVE MOTHERS.**

The *Boston Medical and Surgical Journal* of April 29, 1915, contains an article by EMMONS on this topic. As he well says, in many cases preliminary study and care may seem a needless precaution. There are, however, many dangers and discomforts which may, by careful recognition, be avoided. The most important of these are:

1. Contracted pelvis.
2. Difficult labor from disproportion of pelvis and child.
3. The toxemias of pregnancy.
4. Extra-uterine pregnancy.
5. Placenta previa.
6. Pyelitis.
7. Septic conditions, including gonorrhea.
8. Syphilis.
9. Tumors.
10. Intercurrent disease, as heart troubles, tuberculosis, and malnutrition.

With the outcome intelligently predicted, the mother is confidently reassured and instructed in hygiene, and the nurse is put in charge of the case, with the doctor as consultant to guard against any abnormal condition which may yet develop during pregnancy. The nurse visits the home at intervals of not over ten days. At the first few visits home conditions are seen and instructions given for personal hygiene in diet, baths, clothing, fresh air, sleep, and exercise—*i.e.*, how best to conserve her strength for the good health of the baby and for the physical strain of labor and nursing. Later necessary preparations for the coming of the baby are assured, with every precaution against infection to mother and baby. At all visits the mental and physical condition of the mother is critically observed, a urinary test is made, and the coöperation of the whole family is solicited. The dangerous advice of the gossiping neighbor is less likely to be followed. Experience shows that the tactful nurse is welcome in the home, and her opportunity for good is great. It would be difficult to exaggerate the value of these visits made by an efficient, sympathetic nurse to certain prospective mothers. Seldom will a nurse's personality tell more than in some of these friendly visits. Her social service training will often be invaluable in meeting the situation.

The problems of maternity and its relations with society are enormous. Scarcely a pregnant patient comes to the clinics to-day who is not worried by some social difficulty added to her physical burden. Such problems as illegitimacy, drunkenness, and desertion are frequent, while improvidence, unemployment, and a too-small budget are the usual state. The pregnancy clinic attempts to meet these difficulties through the organization and coöperation of the nurses and social workers. Is the general practitioner prepared and able to do this?

To sum up, pregnancy care is preventive medicine as applied to obstetrics—*i.e.*, the utilization of every known means to keep the prospective mother well and strong, to foresee and forestall dangers, intelligently to provide for confinement. This may be merely proper care in the home at a minimum expense for the normal case, or the best skill available in a hospital for averting tragedy. Preventive obstetrics thus includes a wide knowledge of the anatomy, physiology, psychology, and sociology of the patient.

To obtain the greatest efficiency in pregnancy care there must be coöperation of the doctors, nurses, milk stations, hospitals,

boards of health, and the patients and their families. Turning to the immediate subject of the situation in Boston, the writer wishes to call attention to a piece of work which has resulted in the lowest known infant mortality, and "infant mortality" has been said to be the most sensitive index of the civilization of any locality. This most civilized place is not in Europe or America, but in New Zealand. While Boston has an infant death-rate of over one hundred, and Massachusetts of 130 and over, New Zealand has a rate of fifty-one, and the city of Dunedin a rate of thirty-eight.

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## WHAT SHALL WE DO FOR THE CONVALESCENT MORPHINE ADDICT?

In the *Maryland Medical Journal* for May, 1915, PEARSON asks this question and answers it as follows:

A doctor writing upon morphinism recently said that the best thing to induce sleep in these cases was muscular fatigue. The writer knows of nothing more likely to produce insomnia. Muscular fatigue following even slight exertion during the first few days off the drug produces an intolerable aching of the whole body, and especially the back and legs. Muscular fatigue, or any sort of fatigue, for that matter, is the most prolific cause of relapse that there is. After the craving for morphine has once been overcome it cannot be reëstablished except by a return to the use of the drug. Fatigue will bring on a feeling of the need for some sort of stimulation, but not the old familiar craving for morphine. The convalescent knows of but three stimulants—opium, cocaine, and alcohol. The first means immediate relapse, the other two relapses in the near future.

One would naturally think of pain as being a frequent cause of relapse. It is not. Pain puts the patient sharply upon his guard. He is accordingly prepared to put up a fight to save himself. There is, of course, danger of relapse from pain. But it is not its intensity so much as its protracted duration that needs to be feared. Pain long continued will exhaust the nervous power of resistance that nature has been trying to build up since the last dose. Here again fatigue appears. Before the powers of resistance become exhausted the dentist or surgeon should be called in, if operative procedure is indicated.

We have been accustomed always to look to opium in some form for relief of pain. In the writer's work he makes use of a combination of hyoscine, physostigmine, and pilocarpine—the first two in a solution together of such strength that 20 minims will contain 1/200 grain hyoscine and 1/100 grain physostigmine; the pilocarpine in a solution of 1 grain to the drachm. The first two drugs rarely need to be crowded to the maximum dose as given by the books. The last must be given in at least double the book dose in order to be effective. Hyoscine alone causes a troubled delirium and a feeling of the most intense wretchedness. Physostigmine corrects the bad effect upon the eye, and in this way lessens the hallucinations produced by the hyoscine alone. Its lessening of reflex irritability increases the hypnotic effect of hyoscine. Therapeutic doses also sustain the heart's action. The pilocarpine stops the tossing about, the delirium, and the feeling of wretchedness, and promptly produces a quiet sleep. Double doses of this drug are needed. Double doses of pilocarpine alone would be likely to cause alarming symptoms. Given in this combination they do not. Very little or no diaphoresis is produced.

The writer has been able to arrest the most severe pain with this combination, and it also produces sleep very promptly, while morphine does not. It does not cause nausea or interfere with the appetite. Overwork during the first few weeks is likely to bring on a condition of nervous collapse. Stimulants of any sort should not be given in this case. Hot baths, gentle massage, and absolute rest in bed will soon set the patient all right again. In the latter part of the convalescence overwork may bring on a condition of nervous irritability, insomnia, loss of appetite, etc., that is especially discouraging to the patient and very likely to cause a relapse. This is likely to be the case if the convalescent has not been forewarned of this danger. This condition

may come on as late as a year or eighteen months after the last dose. If its true nature is recognized—*i.e.*, that it is exhaustion of nerve forces that have not been completely restored—it can easily be overcome. No drugs of any kind should be used. Complete rest should be insisted upon. This matter of overwork should always be borne in mind, because it is the most frequent cause of relapse that we have. Next to it comes the abuse of alcohol. It disturbs the stomach, interferes with nutrition, produces nervous irritability, insomnia, and, in short, rapidly breaks down the nervous powers of resistance that nature has been trying to build up since the last dose of morphine.

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## SCOPOLAMINE IN THROAT AND NOSE OPERATIONS.

The *Cleveland Medical Journal* for April, 1915, contains an article by METZENBAUM on this subject. As he says, scopolamine or hyoscine hydrobromide has been in constant use for a quarter of a century in institutions for the care of the nervous and insane. It is the best of cerebral sedatives for controlling and quieting alcoholic and traumatic delirium.

It was from the writer's knowledge of its benefits in these conditions that he first administered scopolamine, in 1900, to modify or control the delirium of the excitation state in ether anesthesia. From 1900 to 1910 he administered a physiological dose of scopolamine 1400 times preliminary to operating under ether, nitrous-oxide-oxygen gas, cocaine or novocaine, and reported the results in the December, 1910, issue of the *Ohio State Medical Journal*.

During the past five years his observations are limited entirely to the administration of scopolamine given before 2200 operations on the ear, nose, throat, and neck.

Adults receive 1/100 of a grain, usually by mouth, or it may be given hypodermically one-half to one hour preceding all operations under local or general anesthesia.

Children are given 1/200 grain coated pill with a little water, one-half to one hour before operating. In children it is only given by hypodermic needle when the immediate effects are required, and morphine is never combined with it.

Scopolamine acts as though it was made up of two radicals, one similar to atropine or belladonna. Since children tolerate belladonna very well, this may explain why they tolerate scopolamine so well.

The atropine radical, like atropine itself, prevents reflex inhibitory stimuli coming through the superior laryngeal nerve and its branches to the vagus. It is therefore of value if given before operations for the removal of adenoids, tonsils, or operations around the base of the tongue, thyroid gland, or larynx, in bronchoscopy, esophagoscopy, and especially in removing foreign bodies from the pharyngeal or laryngeal region when there is considerable traction of the tongue.

The atropine radical does not check the secretion of the kidneys, but it holds in check the mucus during ether anesthesia.

In bronchoscopy there is almost no secretion to wipe away. In operations with local anesthesia on the throat there is almost no saliva to annoy. In operations on the nose the abundant nasal secretion is lessened and the usual profuse discharge following an extensive nasal manipulation in operations is held in check for several hours.

The other radical of scopolamine is a decided brain sedative, for after the administration of a physiological dose of scopolamine the preoperative nervous fear and irritability is changed to one of calm and quietude, so that when desirable the patient may be placed directly on the operating table without manifesting the usual fear and excitement. Scopolamine places the patients under a mild anesthesia, awakening more rapidly, at the same time the anodyne effect lasting for several hours. In nitrous-oxide-oxygen gas, scopolamine renders greater muscular reaction, and at the same time gives a better vasomotor tone.

In operations on the nose and throat under cocaine or novocaine the preliminary administration of scopolamine is of the greatest value. The usual fretful, excited, restless patient becomes quiet, interested, and helpful, so that in the removal of tonsil

or foreign bodies from the throat the patient will often hold the tongue depressor and be entirely free from the usual constant desire to spit, cough, gag, and explode the breath.

In nasal operations the preliminary administration of scopolamine lessens the amount and strength of cocaine or novocaine required, and anesthesia of the bony areas is decidedly more effective, as in the opening of the antrum or sinuses.

When scopolamine is administered in physiological doses it seems free from any immediate or remote detrimental effects, while its benefits are to quiet the patient, benumb his sensibilities, and lessen his irritability to such a degree that he requires less local or general anesthesia to complete the operation.

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### THE USE OF DAHLIA IN INFECTIONS.

To the *American Journal of the Medical Sciences* for May, 1915, RUHRÄH contributes an article on this topic. He tells us that about two years ago in searching for an efficient local application for streptococcic infections of the throat, Dr. Charles Simon suggested the use of dahlia. The writer started this as a local application, beginning at first with weak solutions, and he soon found that the saturated, that is about 4 per cent, solution could be applied to the mucous membranes of the throat or in fact other parts of the body without producing either pain or subsequent irritation. The drug seems to penetrate only to short distances, and for the deeper seated affections has no value, but for superficial involvement of the mucous membranes, whether the infection is due to streptococcus or to other organisms, the effect is quite striking. In some cases but little effect is noted, it is true, but in others there is marked lessening of the intensity of the inflammation and coincidentally a reduction of the constitutional symptoms. It has the advantage over other applications in that it is not painful, does not produce irritation, and is markedly antiseptic. The only disadvantage is the color, which, of course, will stain fabrics with which it comes in contact, although most of these stains can be removed if the garment is immediately washed out in cold water. For ulcerations about the mouth it may be used either by applying a saturated solution or a mouth-wash varying in strength from 1 to 1000 or 1 to 10,000 may be used. The stronger solution need not be used very frequently.

The dahlia not only kills the offending organism, but it has a marked stimulating effect upon the healing. Externally upon skin surfaces the drug may be used with marked benefit, particularly upon ulcerations. The writer has used it with remarkable benefit upon vaccinations which were slow in healing, and upon other abraded surfaces, especially those which are infected. He has not had an opportunity of using it in erysipelas, but Dr. Louis P. Hamburger, of Baltimore, and Dr. T. B. Johnson, of Frederick, have used it in a number of cases, with the most satisfactory results. Dr. Johnson informs the writer that he has used it with remarkable success in both acute and chronic eczema, in herpes, tinea tonsurans, and furunculosis. In one resistant case of tinea sycosis in which the whole surface of the beard was tremendously involved, the patient was cured after five or six daily applications. It may be used with reasonable hope of success in skin lesions caused by or accompanied with pus organisms.

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### EXOPHTHALMIC GOITRE AND ITS TREATMENT.

In the *New York State Journal of Medicine* for January, 1915, ROGERS writes upon this interesting topic and recapitulates the indications for and the forms of treatment.

Rest and good hygiene are essential for the cure of any thyroid disease; the antithyroid serum is the most efficacious of all conservative methods for many cases in the early stages of hyperthyroidism and for some of those in the exophthalmic group. In dosages of ½ to 1 Cc. it is harmless, but if its exhibition intensifies the symptoms it should be discontinued. When conservative methods fail after a month's trial, the ligation of one of more thyroid vessels should

be practiced, or less frequently, and only in selected cases, the excision of half the gland. Local anesthesia is preferable to general narcosis. Ligation of one or more of the chief thyroid vessels will cure a large proportion of all types of hyperthyroidism. It is safer but much slower in its effects than hemithyroidectomy. For exophthalmic goitre or the most advanced and serious form of hyperthyroidism, ligation of all four thyroid vessels seems to offer better hopes of cure than the more radical operation. Hemithyroidectomy seems indicated especially in the third or hyperthyroid stage of the disease rather than in the fourth or that of exophthalmic goitre, and in patients over twenty-five years of age who possess asymmetrical goitres of considerable and not small size.

About 25 per cent of all cases of hyperthyroidism are only improved by hemithyroidectomy, and some 10 per cent of them are not benefited at all or made worse, and the general operative mortality is at least 5 per cent.

Surgery at the best is but a rough approach to the means which a better knowledge of physiology and of organotherapy should provide for the relief of these patients.

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## QUININE INJECTIONS.

The *Indian Medical Gazette* for March, 1915, reminds us that until fairly recently it was believed that hypodermic injections of quinine, as of other medicinal agents, meant more rapid and more concentrated action than is possible with administration by the mouth. Close clinical observations cast doubt upon this orthodox belief. The expected good results were not obtained from hypodermic injections of quinine. The first result was that physicians increased the dose of quinine for hypodermic injection from 2 to 4 grains (as it was some 15 years ago) to 8 or 10 grains, in the hope of getting good therapeutic results. Meanwhile laboratory and clinical experiments were begun to test the comparative value of oral and hypodermic administration, the former in Italy and Germany, and the latter in India (Major Megaw, I.M.S., under Lukis at the Medical College). Mariani (Italy) made an intramuscular injection into the leg of a rabbit, and from the muscle of the rabbit, killed seventeen hours after injection, he recovered 66.5 per cent of the amount injected. Giemsa and Schaumann (Germany) added quinine solution to blood serum in a test-tube and found that a dense precipitate occurred. They tried various quinine preparations and concluded that the compound hydrochloride of quinine and urea, as it produced a less dense precipitate than other preparations, was the best to use hypodermically. Megaw from his clinical results stated that quinine by the mouth reduced the fever of malaria more quickly and effectively than hypodermically.

Before he had discovered Giemsa and Schaumann's work, Major McGilchrist started experiments made on the same lines, but instead of looking for the preparations of quinine which gave the least dense precipitate, he tried to find out if dilution of the quinine salts rendered solutions of these salts compatible with serum. He found that the precipitate got less and less as the quinine salt was more and more diluted, and that finally in a dilution of about 1 in 150 of the quinine salt no precipitate was perceptible. Turning then to experiments on animals, he found that when quinine was injected in this dilution absorption was extremely rapid and effective; but unfortunately the skin at the seat of injection sloughed, leaving an ulcer which took a couple of months to heal. He therefore regarded this method as unsuitable for clinical use and recommended the injection of quinine in extreme dilution intravenously in cases of pernicious malaria —for instance, 7 grains quinine bihydrochloride dissolved in 2 or 3 pints of saline. This extreme dilution not only obviated any danger from thrombosis or shock (from irritation of a strong solution) but afforded the additional advantage of attenuating the toxins and favoring their elimination.

The doctors at Panama, who had found that quinine injections were very unsatisfactory in malignant cases of malaria, saw a summary of this paper and concluded that

this point of dilution would probably solve their difficulties. James (Panama), disregarding McGilchrist's statement that quinine in a dilution of 1 in 150 was not suitable for clinical use, employed this method extensively and with apparently no ulceration or other drawbacks. He reported excellent results. He had also, before seeing the summary of the same paper, tried Bacelli's intravenous injections of quinine (a very strong solution), but these injections he concluded were dangerous to life. Latterly he has given up hypodermic injections of quinine in favor of intravenous injections in extreme dilution for cases of pernicious malaria.

Quinine salts, unless in great dilution, are irritating and very injurious to the tissues at the point of injection. Again, regarding sterilization, none of the salts of quinine stands heating well.

Quinine injections in the strength frequently employed (1 in 10) are not infrequently attended by serious complications and dangers:

1. Necrosis. Quinine, unless in great dilution, kills outright all tissues which by diffusion it reaches.

2. Thrombosis and embolism. A strong solution of quinine may cause thrombosis, if injected even near and not necessarily into a blood-vessel.

3. Paralysis. This may be caused in two ways—(*a*)by direct destruction of a nerve; (*b*) by thrombosis in a large blood-vessel, causing "ischemic paralysis."

4. Ulceration, if the necrosis caused by strong solution reaches skin surface.

In intramuscular injection, the necrosed area does not reach skin surface, so no ulceration results; the necrosed area is ultimately converted into a fibrous nodule in the muscle.

5. Tetanus.

All these ill-effects, including probably the last mentioned, can be obviated to a very large extent by using quinine in great dilution only.

By the intravenous injection of quinine in extreme dilution, the special dangers of the subcutaneous and intramuscular methods are avoided. There is no danger of necrosis, paralysis, ulceration, or thrombosis. It is also very doubtful if the introduction of tetanus spores with the intravenous injection in a bulk of 2 or 3 pints would produce any harm. Pure tetanus cultures introduced into the blood are soon destroyed unless conditions favoring their multiplication are present (Kolle and Wassermann). The only factor which could possibly favor their multiplication is the presence of the chemical agent quinine itself, and quinine in such extreme dilution would be unable to favor the development of tetanus bacilli.

Regarding the various salts of quinine, it is of little consequence which salt is used so long as the importance of dilution is observed. The more soluble salts, bihydrochloride, lactate, etc., are generally used, but because of their great solubility the warning regarding dilution must be emphasized.

McGilchrist, because it is usually stocked by all chemists and therefore easily obtained, employs bihydrochloride. This is an acid salt; and one further warning is necessary for those who are employed in districts where blackwater fever is prevalent. Acid salts of quinine are powerful hemolytic agents, therefore in such districts the injection of acid salts should be done circumspectly.

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### SINUSITIS AND OTITIS MEDIA.

BRADFORD in the *Wisconsin Medical Journal* for April, 1915, believes that many, in fact most, cases of sinusitis are preventable by early constitutional and local treatment. The patient is put to bed and kept quiet, and is given a nutritious and easily digested diet; internally, calomel, opium, belladonna, aconite, camphor, salicylates, quinine, etc., as best suited to the case. Attention to elimination of skin, bowels and kidneys is important. Leukodescent light has been in great favor. The writer has found great satisfaction from heat or electric light with blue globe used in the instrument made by the Camp Company of La Crosse, called the "Radio Bell," and it will be a difficult thing to convince his patients

who have used it that it lacks virtue in these inflammatory troubles.

Locally the great principle is drainage. In the acute stages local congestion should be reduced and prevented when possible by adrenalin in weak solution sprayed into the nose often enough to keep up the effect. The addition of cocaine, eucaine, or novocaine has a pleasant effect in reducing pain. The writer prefers the cocaine where no contraindication exists, but if used it should never be put in the hands of the patient, nor used until there is danger of forming the habit. This followed by a spray of 10-per-cent antipyrin very much prolongs the effect, but if used too often it becomes irritating. [Ten per cent seems to us very strong.—Ed.] Occasionally cleansing the nose with warm Dobell's solution is very pleasant, but the patient should not go out into the cold air for some time afterward. One-per-cent solution of camphor and menthol in oily base is excellent. This treatment contracts the intumescence, keeps the ostii of sinuses open, allows drainage, and resolution takes place without any serious results.

In acute otitis media, however, it is different. Here the counter-irritation and antiseptic effect of a 12½-per-cent solution of carbolic acid in glycerin put in the external meatus warm and kept there by a plug of cotton, so placed as to be tight and stay in place, is almost a specific. However, if applied late, so that the middle meatus is filled with serum and the tympanum bulges to any great extent, a free paracentesis should always be made under strict asepsis, which must be followed until healing takes place. We should remember, however, if acute otitis media is once purulent perforation is inevitable, and the sooner paracentesis is made the better, as many cases of mastoiditis will be prevented by early free incision carried well up to the attic. Above all, here is the place to remember the principle of drainage and where the writer is sorry to say he finds more errors of better surgeons than in any other department of surgery with which he is acquainted. It were better that no syringe were ever made, as far as usefulness in ear troubles is concerned, than that one should be used in acute otitis media. They not only do no good, but often force the septic fluids into the attic and mastoid antrum and greatly widen the field of infection. If one wants a mastoidectomy, just use freely the syringe in acute suppurating otitis media.

The writer hopes the medical profession will soon wake up to the fact that the use of the syringe in acute otitis media is either the result of ignorance or is wilful negligence. The ideal drainage is gauze, which should be placed loosely in the meatus, but must reach the perforation itself and draw the fluid out of the meatus as fast as secreted and never allow it to accumulate in middle ear or external meatus. Practically, the writer can get much better results with the ordinary nurse by using the simple absorbent cotton drain. This is rolled loosely on a toothpick and inserted loosely into the external meatus, and allowed to remain until soaked for a distance of one-fourth to one-half inch; it is then removed and replaced by a new one, and the process kept up till healing takes place, often requiring changing as often as every fifteen minutes the first few days.

When the antrum of Highmore has become purulent from alveolar abscess, treatment of alveolar necrosis and drainage through the opening is proper; when from nasal infection, trephining through the lower meatus of the inner wall, making the opening large enough so that it will remain patulous, is the best treatment. Often a portion of the lower turbinated bone must be removed, but never more than necessary, unless there is hypertrophy which is obstructive to breathing and needs removal. The cavities may be washed out as needed with an alkaline, antiseptic solution, and antiseptics such as argyrol or ichthyol injected until healed, but often no further treatment than ordinary nasal cleansing is needed.

Acute sepsis in the frontal sinuses may drain and recover spontaneously, but will be greatly helped by the ischemic treatment of the vicious circle. When pain becomes very severe and there is evidence of great

pressure, the anterior end of the middle turbinated bone should be removed and the frontal sinuses opened with curette if possible. If not, and the superior palpebral and orbital contents begin to swell, the sinuses should be opened externally and the natural opening into the nose enlarged, drainage inserted, and the external opening closed. Lavage and drainage should be continued through the nose until healed.

Acute suppuration of the ethmoidal cells and sphenoidal sinuses is also greatly helped by the ischemic treatment and may heal spontaneously, but when marked suppuration is present it is best to remove the middle turbinated bone and open the cells and natural opening of the sphenoidal antrum so as to assure good drainage.

Acute suppurating mastoiditis often drains freely through the middle meatus, and simple drainage is all that is needed for perfect resolution. But when there is evidence of pressure, as indicated by pain, tenderness, and edema of mastoid, Bradford pleads for an early simple mastoidectomy with simple drainage by rubber tube or cigarette drain without injury to the lining membrane of the cavity.

The treatment of chronic catarrhal sinusitis should be the removal of all abnormalities which interfere with normal breathing and cause pressure on parts which should be free, or which interfere with normal drainage of the accessory sinuses. Where the septum is deflected to one or both sides the submucous dissection of all the abnormal part of the septum should be made. This is one of the greatest achievements of modern surgery, and when properly performed gives absolutely perfect results with no bad effects whatever. When there are long-standing ulcers or erosions of the septum on one or both sides it is sometimes impossible to prevent breaking down and perforation, but this is far better than obstructed breathing or sinusitis and deafness, which often result from the obstruction. All people with deflected septums causing obstruction in breathing should be warned of the great danger and almost sure loss of hearing if not corrected. Large spurs interfering with free breathing on otherwise straight septa are best removed submucously. There is a class of marked, thin, linear spurs which it may be still considered good surgery to remove with the saw. Portions of hypertrophied and misplaced turbinates should be removed so as to give free normal breathing and allow free drainage of the sinuses. Again the principle of making and leaving a perfectly normal nasal cavity should be observed.

There is a chronic catarrhal otitis media caused by some poison in the system, which we do not yet understand, which results in hyperostosis of the middle meatus and the inner ear, and results in almost if not perfect deafness, for which there is no known successful treatment, and very few of the cases are ever helped. Heredity and probably a lithemic or gouty diathesis are important factors. This variety should not be confounded with the simple chronic catarrhal kind, which is caused by the irritation from defective breathing and systemic poisoning from absorption in septic sinusitis. This last variety may be prevented by early surgery, and the process may even be stayed, after hearing is very bad, by proper nasal surgery. The aurist is now able to be of great benefit in this class of cases, in which formerly we were able to do but little if anything for the patient.

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## THE NEWER INDICATIONS FOR REMOVAL OF THE SPLEEN.

The *Clinical Journal* for Wednesday, April 14, 1915, contains an article on this topic by SIDNEY BOYD. He says that one of the most important diseases coming within the scope of his paper is what is usually designated "splenic anemia."

The term "splenic anemia" has been used in an extremely wide sense to include many varieties of splenomegaly with anemia which cannot be said to belong to any other known disease. Considerable confusion has therefore arisen, but the term "splenic anemia" should be rigidly restricted, as suggested by Osler, to cases showing an enlarged spleen with oligocythemia and a low color-index, no leucocytosis, but usually

the opposite condition — leucopenia — a tendency to gastrointestinal hemorrhage (which may be severe) and to pigmentation of the skin. Moreover, the disease is usually one of many years' duration, and in its advanced stage is further characterized by cirrhosis of the liver, ascites, and sometimes jaundice, making up the clinical picture generally known as Banti's disease. Rolleston recognizes two forms of splenic anemia, one of which develops in the course of from five to seven years into Banti's disease, and the other, with a much more protracted course, which does not. The disease affects children as well as adults.

Many theories have been suggested for the causation of splenic anemia, into which it is not necessary for the writer to enter. Banti himself believes the disease is due to some infecting agent, although his cultural experiments have been negative; and even grafting of a portion of the diseased organ into that of a living dog has given no result. Osler regards the spleen as the primary seat of the disease and advises splenectomy in all cases. Rolleston believes it is due to a chronic infective or toxic process in the spleen, and that the gastric hemorrhage is due to rupture of dilated vasa brevia secondary to some obstruction in the splenic vein, causing the blood in the vasa brevia to pass in the reverse direction to the normal.

More recently A. G. Gibson has described what he believes to be a streptothrix in the spleen in these cases, but his discovery has not up to the present received general acceptance.

Giffin has drawn attention to the association of gall-bladder disease with splenic anemia, and found evidence of it in five out of twenty-seven cases at the Mayo clinic. He regards this as a possible source of infection to which the splenic anemia is secondary.

Splenectomy, however, as is only to be expected, is far more successful in the early stages of this malady than in the terminal stage. The difference in the mortality of the operation is enormous. In the former it is about 10 per cent; in the latter it is about 50 per cent, or even higher.

The treatment of uncomplicated splenic anemia by removal of the spleen has now been established on a firm basis and should be performed as soon as the diagnosis is made. Many successful cases have been published in the last few years in the British Isles and abroad. Although remissions may occur in the earlier stages of the disease, the course, though protracted, is, apart from operation, invariably toward a fatal issue.

The ultimate result is also far more likely to be satisfactory if an early splenectomy is performed. Nevertheless, in the five cases of splenectomy for splenic anemia complicated by cirrhosis at the Mayo clinic four of the patients were in good health many years afterward; one died three years later with ascites; and one, who had ascites at the time of operation, was alive and well seven years later.

Kidd refers to a case operated upon in the third stage, where the symptoms returned and proved fatal two years after an apparently successful splenectomy. Perhaps a more lasting result would be obtained by combining splenectomy with omentopexy, as suggested by Tansini, and successfully practiced by him in two cases.

In cases, however, in which the diagnosis of splenic anemia is complicated by other diseases of a chronic infectious nature, of which the most frequent appears to be nephritis, splenectomy is of questionable value. Out of twenty-seven cases of splenectomy at the Mayo clinic four were of this nature.

*Chronic Acholuric (Hemolytic) Jaundice.* —This subject has attracted considerable attention in recent years, and from a surgical standpoint it possesses a great fascination, because it is in some of these cases that splenectomy gives its most brilliant results.

According to Leuret, icterus with acholuria may occur in the course of infectious fevers, parasitic affections and intoxications, in icterus neonatorum, and in some cases of myeloid leukemia, but the term "chronic acholuric jaundice" is generally used to cover a clinical group of cases which some authorities regard as entirely

distinct from splenic anemia, while others see in the group merely varieties of this disease. The main points of difference are that in splenic anemia there is aplasia of the blood-forming organs and no signs in the urine or elsewhere of increased hemolysis. In acholuric (hemolytic) jaundice the blood generally shows evidence of a hemopoietic reaction on the part of the red marrow as evidenced by the presence of normoblasts, myelocytes, polychrome staining, and basophile granulation in the red cells (Banti's hemopoietic form of "splenomegalie hæmolytique"). In some cases as many as 40 per cent of the red cells may show the latter change. These characteristics may, however, be absent from the blood (anhemopoietic form) as in a case recorded by Banti, but in which splenectomy nevertheless cured the patient.

For the present, however, perhaps it is better to regard these cases of acholuric (hemolytic) jaundice as distinct from splenic anemia and to classify them under the two headings of acquired and non-acquired. The latter may be subdivided into congenital and familial, although congenital cases may be familial, and familial cases may be, but are not necessarily, congenital. Either familial or congenital cases may or may not be hereditary. All cases show an enlargement of the spleen and a certain amount of anemia, which may be severe, and very often the red cells show an increased fragility in hypotonic saline solutions. This, however, at any rate in the acquired cases, is by no means always the case, and, moreover, Gilbert and Lereboullet deny also that it is a true criterion of the non-acquired cases. The acquired cases are usually very much more definitely ill than the non-acquired, some of which may live to a considerable age and carry on an ordinary vocation. Acquired cases, moreover, seem to progress steadily down hill, and are usually fatal in from six to twelve years, terminating in cirrhosis of the liver and ascites (Lintvarev). At the same time it must be remembered that even the non-acquired cases may proceed to hepatic cirrhosis and ascites, as in a case reported by Parkes Weber.

Several cases of alcholuric (hemolytic) jaundice, both of the acquired and non-acquired types, have been subjected to splenectomy, in most cases with a happy result, the jaundice disappearing in a very short time. Many of the acquired cases have an enlarged liver, which diminishes in size after splenectomy. At the last January meeting of the Clinical Section of the Royal Society of Medicine the writer showed an example of the acquired type in which splenectomy had effected a complete cure.

An interesting point may be noted with regard to the fragility of the red cells. In some cases the fragility has become normal some months after the operation, while in others it has persisted for years, although the patients are apparently in good health.

Banti has written at length on the acquired cases and designates the condition as "splenomegalie hæmolytique," while other writers speak of the condition as "hemolytic splenomegalic jaundice" (Micheli). In some cases the jaundice may be permanently or intermittently absent, a condition which would be covered by Banti's designation, and for which Parkes Weber has suggested the term "splenomegalic anemia."

Banti regards the condition as due to four factors:

1. A hemolytic agent, the nature and situation of which is unknown.

2. This agent produces chemical substances which stimulate the spleen to hemolytic hyperactivity. This hyperactivity reveals itself as an enlargement of the organ.

3. An anemia which is the direct consequence of the hyperhemolysis, and is coincident in degree with the increased icterus and uribilinuria which occurs in periods of exacerbation of the disease.

4. Jaundice, which is also due to the same cause. As already stated, this last feature may be absent or considerably delayed. In one of Banti's cases jaundice did not occur until fourteen years and in Umber's case not until eight years after the onset.

It is by no means certain that the icteric tinge in these cases is due to bile pigment, but may quite possibly be due to the direct products of hemolysis.

Banti believes that these diseases are due

to the stimulatory action of some hemolytic agent on the macrophages of the hemolytic organs (erythrophages of von Kölliker and Lintvarev), which are the spleen, liver, lymphatic glands, and marrow of bones, and of these the spleen is by far the most sensitive and the most active. By experiments on animals he finds that hemolytic agents, such as hemolytic serum, toluylenediamine, and phenyl-hydrazine, have a far greater hemolytic action on normal animals than on those in which the spleen has been removed. These observations confirm those previously made by William Hunter.

Banti does not think the hemolytic agent is in the spleen, but that it produces substances capable of exciting in this organ hyperactive hemolysis. Hence, removal of the spleen gives a clinical cure. Whatever may be the exact rôle which the splenopathy plays in this group of cases, there is no gainsaying the fact that they are rapidly restored to health when the spleen is removed. Theoretically, in grave cases, the agent will be sufficiently powerful to revive the hemolytic process in the secondary hemolytic organs (liver, lymphatic glands, and marrow). Splenectomy will then be useless or ameliorate only for a time. As far as the writer knows, however, such relapses have not yet been known to occur.

Sir Bertrand Dawson has drawn attention to the liability of these patients to develop gall-stones, and urges this as an additional reason for removal of the spleen in both acquired and non-acquired types of hemolytic jaundice.

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## FLEA DESTRUCTION AS A PLAGUE MEASURE.

In the *Indian Medical Gazette* for March, 1915, the following useful note by Lieutenant-Colonel D. T. Lane, M.D., I.M.S., chief plague officer in the Punjab, is herewith published:

Numerous experiments carried out in the Malaria Bureau, Lahore, prove beyond doubt that cresol vapor is extremely poisonous to fleas. The vapor, though very fatal to fleas, is harmless to man and animals.

Two ounces of cresol vaporized in a room with closed windows and doors kills the fleas in the room.

There are two methods of using cresol vapor:

*First Method.*—Kindle a small cow-dung fire, made of four or five cow-dung cakes, in a wide iron cup till it is well smoldering—not in flame. Place the iron cup containing the smoldering cow-dung fire in a room with the doors and windows closed and pour 2 ounces of cresol on it; let it smolder until completely burned. This takes place in about two hours.

*Second Method.*—Close the doors and windows of the room, place a vessel containing a fire of any material, provided the fire is not in flame, in any convenient part of the room, and put a cup containing 2 ounces of cresol in it and let it vaporize, which it does in about an hour.

Either of these methods kills the fleas in the room. One has to be careful that the cresol is vaporized and does not ignite. If cresol is poured on a flaming fire it ignites and burns with a dense black smoke which is absolutely harmless to fleas. If poured on a smoldering cow-dung fire or put into a cup placed over heat there is no light, but there is a grayish vapor which is extremely poisonous to fleas, though not offensive or injurious to man or animals.

The cow-dung fire should be smoldering throughout but not red or in flame. The most convenient way to proceed is to have the doors and windows in the houses closed. Then kindle the cow-dung fires outside the houses, and when they are smoldering have them taken into the houses and pour the cresol on them.

The rooms should be kept closed until the vapor disappears, which it does in two or three hours.

One can easily test the work at any time by putting fleas from dogs, rats, or any animal into purses made of closely-woven mosquito netting or gauze and placing them on the floor and inserting them into crevices in the walls and roofs.

Flea destruction should be used to supplement and not to replace any of our

present plague preventive measures. It should be employed in combination with rat destruction (smoking, baiting, trapping) in the infected house and adjoining houses.

It is also most important that fleas should be destroyed in houses which have been evacuated before the people return to them.

Houses which have been evacuated frequently swarm with fleas, and it is very dangerous to enter them if the fleas have not been destroyed.

It is an every-day occurrence for people to contract plague on reëntering houses they have evacuated. One should warn people who have evacuated their houses not to reënter them until the fleas have been destroyed. Another matter, in connection with the prevention of plague, is that equal parts of kerosene oil and mustard oil smeared on the legs, arms, and necks prevents fleas from biting, to a very great extent. The local application of these oils is harmless, they can be obtained in every village, and the smell is not really very offensive. One should advise the people in infected villages to smear their legs, arms, and necks with equal parts of kerosene and mustard oil three or four times a day. A little oil of citronella added to equal parts of kerosene and mustard oil removes the smell of kerosene oil and imparts to the mixture the smell of citronella oil.

[Equal parts of mustard oil and kerosene as we have it would be too irritating to the skin.—Ed.]

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## MANUFACTURE OF SALVARSAN PRODUCTS IN ENGLAND AND FRANCE.

The *British Medical Journal* of April 10, 1915, points out that in consequence of the outbreak of war the Board of Trade suspended the patent and trade-mark of the drugs salvarsan and neosalvarsan, and granted a license for the manufacture in England of these preparations, which they sell under the names of Kharsivan and Neo-Kharsivan, and to the Société Anonyme des Establissements Poulenc Fréres, of Paris, for the sale in Great Britain of the same products under the names of Arsenobenzol-Billon and Nov-Arsenobenzol-Billon.

It must be understood that although the manufacturers have in both instances adopted distinguishing trade names for their preparations, the latter are not merely similar substitutes for but are chemically identical with salvarsan and neosalvarsan, differing in no known respect from Ehrlich's original products, either in their final constitution or in the details of their preparation. The proof of such absolute identity is, however, in the case of these substances, a matter not only of great importance, but of unusual difficulty. Salvarsan is a highly reduced substance. If the reduction, which constitutes one stage of its manufacture, is carried out with insufficient vigor, or if the product is later exposed to the danger of oxidation by contact with air, it is readily contaminated with a much more toxic oxidation product. The water-soluble derivative "neosalvarsan" is even more liable to this defect. As a matter of fact it is impossible, by the most careful procedure, altogether to exclude the presence of the more toxic oxide, and the best specimens, from any source, contain it in the proportion of about 0.5 per cent. The extent of this known contamination can be chemically determined with some degree of accuracy, and it is an obligation resting upon the manufacturer to see that no batch of his product contains it in an unsafe proportion. According to Ehrlich, the proportion varies from 0.5 to 0.8 per cent in good specimens.

If the presence of an excess of this easily recognizable and determinable oxide were the only source of difficulty or danger, a chemical standard of purity, on similar lines to many in the Pharmacopœia, could easily have been defined and enforced for these preparations. Unfortunately there are indications that other toxic products, of unknown constitution, may arise through uncontrollable accidents of preparation. The presence of these is only indicated by the fact that the toxicity of the salvarsan products cannot be accounted for by the percentage of the known toxic oxide which they contain. While, therefore, the determination of the latter is a necessary

safeguard, it can be regarded as a preliminary precaution only, and the final appeal, in the present state of knowledge, must be to animal experimentation, the result of which gives evidence of the total toxicity from whatever source it comes.

The Board of Trade license in both the above cases was therefore granted subject to the condition that all samples of these drugs sold in this country should be submitted to biological tests by an authority approved by the Board of Trade.

On the special emergency created by the war the Medical Research Committee, at the request of the Board of Trade, accepted for the time being the responsibility of directing the biological tests of the salvarsan and neosalvarsan produced by these English and French firms.

Examples of these products, therefore, cannot be properly sold in England unless and until samples of the batch of products from which they are taken have been tested under the direction of the committee, and a certificate has been issued by the secretary of the committee approving that particular batch for sale.

In view of the public interest which must attend the establishment of so intricate a manufacturing process in England at a short notice, and in view also of the great importance to the medical profession and the public of the degree to which success has been attained in the manufacture, it is thought desirable that a general statement should be made of the policy which the Medical Research Committee have pursued in their performance of the public duty which has fallen to them.

When the work of biologically testing samples of these arsenical compounds from other than German sources was undertaken, there was no time for any elaborate preliminary investigation of new methods of biological assay. The public need for an immediate and abundant supply was urgent, and the existing stocks of German production were found to be too low to allow delay.

The committee entrusted the details of the work to the most competent pharmacological workers, who took as a basis for the biological control, supplementing the chemical tests of the manufacturer, the methods and standards which had previously been found adequate in Ehrlich's Institute. It was decided, accordingly, that specimens should be passed as satisfactory, under the official certificate of the committee, which were not more toxic to mice than the average sample of German manufacture. This decision has already involved the rejection of some samples which exhibited no greater toxicity than some of those previously issued in England with Ehrlich's authority, and used therapeutically without adverse result.

In addition, however, to this application in all cases of the official German test, every sample has been further tested by the intravenous injection into a rabbit of a large dose only slightly less than that which may be expected, according to Ehrlich's publications, to be lethal for the animal. The object of this test was to guard against the presence of any immediate toxic constituent which might escape detection when doses were given hypodermically to mice. If, in the performance of this test, any difference had been found to exist as between the English or French products on the one hand and the original German products on the other, the sample in question would not have been passed for certification and for sale to the public.

It should also be added that in addition to these biological tests which have been imposed as an invariable routine, the committee have caused experimental assurance to be obtained that both the French and English preparations are equivalent to the German in therapeutic effect. This has been done by a comparison of their relative potencies in curing experimental trypanosomiasis in mice and experimental spirochætæ infections in rabbits.

In the opinion of the Medical Research Committee the experimental work which has been done under their direction has already shown that the problem of the successful manufacture of the salvarsan compounds in England and France has been

solved. By the communication from time to time to the manufacturers of certain findings of the scientific workers entrusted with the problem by the committee, assistance has been given wherever possible toward the establishment of fully satisfactory technical manufacturing methods, and the committee is confident that, so far as the strictest laboratory controls can insure it, the profession and the public are now receiving from English and French sources compounds fully up to the standard of the best German samples previously sold. It is to be hoped that very soon the quantity of the products so supplied will be as sufficient as their quality.

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## THE RETENTION OF SALVARSAN.

McGURN, in the *Medical Record* of April 17, 1915, reports investigations as to this matter and states that some of the facts acquired as a result of his observations are as follows:

1. Salvarsan cannot be produced in pure chemical solution until it has passed a filter equal to that of a porcelain tube.

2. From 26 to 32 drops (standardized to one minim each) of a 15-per-cent solution of sodium hydrate are necessary to the production of 0.6 gramme salvarsan in alkaline solution.

3. The dilution of an alkaline solution of salvarsan with sodium chloride solution reduces the percentage of its alkalinity and often causes a sudden precipitation of the drug, with a faint leuco-opalescence appearing throughout the fluid.

4. Vigorous shaking with distilled water free from microörganisms at a temperature of at least 110° F. is important as the first step in the mixing of salvarsan.

A question which may be justly propounded is: What effect does this higher percentage of alkalinity have on the action of the drug as a spirochetacide? While at present no fixed or definite answer can be given, the clinical results with a limited numbes of serological reactions would indicate a proportional increase of efficiency. Of all patients treated by the writer with both salvarsan and neosalvarsan, 90 per cent in number elect salvarsan as the one from which they derived the greater benefit, and it is to this opinion that the writer is inclined.

In conclusion the writer wishes to sanction the opinion expressed by Dr. Clarence Martin of St. Louis that "the last word on salvarsan is far from having been written," and to reaffirm his belief that salvarsan retention means salvarsan fatality; also, that retained salvarsan with its resultant hemorrhagic encephalitis or acute degenerative nephritis would not have occurred had it not been for the presence, in the solution, of insoluble salvarsan bodies which could not have passed a porcelain tube; and finally, that when scientific methods are universally employed in the intravenous administration of salvarsan and neosalvarsan, the last word on "the pathogenesis of salvarsan fatalities" will have been written and the "retention of salvarsan" forgotten.

It is to be regretted that many of the afflicted are holding aloof from salvarsan to-day through fear engendered by the not infrequent disastrous results reported through the public press; for it is highly probable that, when due respect is given its avoidable dangers, salvarsan is one of the safest and most efficient drugs ever employed as an heroic therapeutic agent.

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## ROENTGENIZATION OF THE THYMUS GLAND IN GRAVES'S DISEASE.

In the *Journal of the American Medical Association* of April 24, 1915, WATERS concludes a paper on this topic as follows:

Roentgenization will cure, temporarily at least, some cases of Graves's disease. It will effect an apparent cure in some cases of hyperthyroidism when other measures have failed. Intensive irradiation under strict and rigid technique has no bad or ill effect on patients with Graves's disease. From results in this country and foreign clinics, evidence enough is at hand to warrant a more liberal employment of this treatment.

## A FEW SUGGESTIONS AS TO TREATMENT OF A DIABETIC PATIENT.

BLUM in the *Medical Record* of April 24, 1915, says that diabetics in general may be classified under three headings: (1) The mild type, in which it is comparatively easy to rid the urine of glucose by means of a suitable diet and a limitation of the intake of carbohydrate food. (2) The intermediate, in which the urine can with more difficulty be rendered sugar-free, viz., by also limiting the intake of protein food; in this type of case the urine at times, no matter what the character of the diet, will contain a slight trace of glucose. (3) The severe form, in which both restrictions or withdrawals of proteins and carbohydrates will not render the urine sugar-free.

In beginning treatment place the patient on a regular diet containing a normal amount of carbohydrate food for three days, and from three daily specimens of a twenty-four-hour urine get the average percentage of glucose content. If the case is not one of the severe form, or in cases in which there is no evidence of any serious complication or danger, in which a further reduction in weight will prove disastrous, or in cases in which there is no existing severe glycosuria and polyuria or marked acidosis, the following test diet is used. It differs but slightly from the usual test diets employed by others:

| | Calories |
|---|---|
| *Breakfast:* | |
| Cup of coffee or tea with 2 oz. cream | 100 |
| ½ lb. ham with one egg | 1125 |
| 1 oz. butter | 220 |
| *Luncheon:* | |
| Two eggs in any form prepared without flour and with butter | 200 |
| ¼ lb. meat, vegetables | 400 |
| ½ oz. full cream cheese | 50 |
| Small cup coffee, glass table water. | |
| *Dinner:* | |
| Soup prepared with an egg | 90 |
| ½ lb. meat containing large amount fat, or ¼ lb. meat and ½ lb. fish with plenty of butter sauce | 950 |
| ⅛ lb. vegetables, cup coffee with 2 oz. cream | 110 |
| Total | 3245 |

On the first day, in addition to this diet, two slices of ordinary wheat bread are given; on the second day one slice, and on the third no bread at all. As can be seen, this diet contains a very much larger number of calories than a person weighing 150 pounds would require in the course of twenty-four hours under ordinary exercise. The vegetables allowed are cucumbers, tomatoes, canned asparagus, green asparagus, spinach, lettuce, canned string or little green beans, canned haricot and wax beans, canned okra and Brussels sprouts. All of these contain an average of less than 4 per cent carbohydrate, and some can be employed in the preparation of salad. Since the vegetables are taken in such small quantity, the diet for all purposes might be regarded as being carbohydrate-free.

If the case be not one in which the diet is contraindicated, the patient should be kept on this as long as possible up to a period of two weeks; if he is doing well on the diet, even longer. During this time a careful watch must be made of the urine. Acetone and diacetic acid will invariably be found, in cases even in which it had not been present before the test diet had been given. During the interval that the test diet is being given the weight will diminish from three to ten pounds in a patient weighing 150 pounds. The patient as a rule will become sugar-free and the polyuria will diminish.

At the time the test diet is begun it is well to begin the administration of bicarbonate of soda in doses sufficiently large to render the urine alkaline, and also as a preventive to acidosis. A half-ounce a day in divided doses is sufficient. Four parts of this combined with Rochelle salts, one part, serves a double purpose.

The longer this test diet can be kept up without the patient suffering too great loss of weight the greater will be his carbohydrate toleration, and the better the prognosis of the case. To calculate the toleration for carbohydrate wheat bread in one-ounce slices is added slowly to the test diet in increasing amounts until the urine begins to show traces of glucose. Since wheat bread averages about 57 per cent carbohydrate, a diet which will be more or less permanent can easily be arranged by substituting other carbohydrate food in place of some of the bread, if desired, the total

carbohydrate content not to be any greater than the total amount represented by the patient's toleration for wheat bread; rather is it better to allow it to contain an amount just below the toleration point. In mild cases a diabetic is usually able to tolerate 100 grammes of carbohydrate daily, and if a portion of this is represented by wheat bread a very liberal diet made up of different foods containing the lesser amounts of carbohydrate can be taken.

Nearly every mild case of diabetes can be controlled by diet alone, the patient becoming stronger and feeling better; the pains which are present in the calf of the leg in a majority of cases disappear entirely after the urine has been kept sugar-free, the polyuria gradually ceasing, the weight no longer diminishing.

In cases in which there is a deficiency in the amount of urine excreted, citrate of potassium is of service; this also may be combined with the sodium carbonate along with the Rochelle salts if the latter is required.

A very important symptom needing attention in diabetics is constipation; in some of the cases this alone is responsible for an accompanying acidosis. The use of Rochelle salts or a mild aperient water in sufficient dose to produce a laxative effect is all that is required to correct this tendency.

The skin of a diabetic needs careful attention; the use of a bland neutral soap and an occasional douche in addition to frequent bathing will tend to ward off any serious trouble.

Exercising of the musculature of the body should be insisted upon, as by it glycogen is consumed, the patient is benefited, and waste products are eliminated. Almost any form of exercise may be indulged in unless there is a contraindication present in one of the vital organs.

The great tendency for diabetics to possess a somewhat neurotic temperament makes it incumbent upon the physician to divert from the patient's mind anything that may exert a harmful influence. Too frequent examination of the urine should not be encouraged if the case is progressing satisfactorily, and no one but the physician himself, if he is able, should examine the urine; if examinations are made at a reputable laboratory, reports should be sent to the physician. It has been shown that even though diabetes cannot be caused by a neurotic temperament, the glycosuria is influenced by the latter to a marked extent.

As regards medicinal treatment, the author has not had any experience beyond the use of arsenic in the mild cases in which diet alone was not enough to prevent the glycosuria; it is usually unnecessary to go beyond the sphere of diet. In cases in which it is necessary, Fowler's solution to the point of tolerance is a valuable adjunct.

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### TREATMENT OF HEART DISEASE.

In the *Clinical Journal* of April 14, 1915, POWELL in writing on this subject reminds us that one cannot alter the heart condition. We can, however, control the life within its limitations. One must not deprive the heart altogether of the stimulus of exertion, or it will get lazy and atonic, and must not put too much stress upon it, or its slight reserve powers will be overtaxed. One must not check the patient at every turn and fidget him with restrictions, or life will not be worth living, and will-power is lessened.

To put these views in a practical form the writer quotes the latter portion of a letter of advice concerning a patient. As regards treatment:

"(1) The patient must have regard to his limitations—*i.e.*, not to overtax an always laboring right ventricle by straining or fatiguing exercises, but at the same time not to be an invalid. I therefore told him that at cricket he might do batting and wicket-keeping, but he must not scout or bowl or run. He might play moderate golf or do some covert shooting or motor driving (but must not start the machine). An occasional twenty-four hours in bed on any excuse, and perhaps in any case once a week or fortnight, will do him good, but to lay him by would only enervate the heart

and, I think, precipitate the trouble. I advised him to continue his morning's work and to have a rest after lunch.

"(2) I look upon his sweating as arising from nervous depression after influenza, and would try:

℞ Liq. strychninæ, minims xxxvi;
Acidi phosphoric dil., fluidrachms ijss;
Tinct. belladonnæ, fluidrachm ss;
Tinct. digitalis, fluidrachm ss;
Syr. aurantii, fluidrachm ounce j;
Aq. chloroformi q. s. ad fluidounces vj.

One measured tablespoonful in a wineglass of water at 10:30 a. m. and 3 p. m.

"If considered advisable 12 minims of tinctura ferri perchloridi may be added to each dose at the time of taking. If you find the tonic does not meet the case you might try a little arsenic."

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## THE TREATMENT OF THE TOXEMIA OF LATER PREGNANCY.

Writing in the *British Medical Journal* of May 22, 1915, BYERS states that in the treatment of the preëclamptic and the nephritic toxemia every effort should be made to relieve the kidneys by getting the skin and bowels to act, and by the administration of a simple non-nitrogenous diet. If there be headache or edema the patient, in addition, should be kept in bed, and should have hot baths, free purgation, and a milk diet; and if the state of affairs becomes more severe, warm saline lavage of the stomach and intestines is useful. In the nephritic cases, if in spite of this method of management they get worse, labor should be induced.

One of the most important points to be emphasized is that a pregnant woman's urine must be analyzed once a month during the first six months of gestation, and at least once a fortnight after that period. Since adopting this routine method the writer has not had in private practice during the past fifteen years a single case of eclampsia, as prompt measures taken, when an examination of the urine showed any considerable amount of albumin (and under these circumstances a catheter specimen should always be obtained), and with it any diminution in urea and nitrogen output, warded off all risk of convulsions and coma.

At the Maternity Hospital, Belfast, almost every month when the writer is on duty cases of eclampsia are sent in, and invariably the history given is that no doctor had ever been asked to see these patients until their condition—from the presence of convulsions or coma—had become extremely grave. One of the great blots in the Insurance Act is that a woman can get maternity benefit without being obliged to see any doctor during her pregnancy. Had it been made compulsory that, in order to render themselves eligible for maternity benefit, women must report themselves regularly during pregnancy to a doctor whom they had selected to attend them at their confinement, not only would most cases of eclampsia be prevented, but it would also be recognized at a sufficiently early time that certain of these patients had contracted pelves, and arrangements could be made beforehand to adopt the special operative measures necessary to secure for them and their children a safe delivery. As matters stand at present among the working classes, the medical attendant is too often called for the first time only when, in the case of pregnancy, the patient is in convulsions or coma, or he is summoned to find at the time of confinement a condition needing some special form of operative delivery if mother and child are to live.

At the present time two most contradictory views are held by experienced obstetricians as to the proper treatment of eclampsia. According to one school the best results will be obtained if delivery be effected as soon after a patient has had her first convulsion as is consistent with her safety. Such a line of action naturally appeals to those who believe that the toxin originates within the pregnant uterus, and that, therefore, the sooner that organ is emptied the better it will be for the patient, and the most advanced advocates of this method recommend some form of Cæsarian section—abdominal or vaginal. The other line of opinion is that better results are obtained by treating the toxemic condition,

and not by inducing labor, either by the very dangerous accouchement forcé, or by any form of Cæsarian section. The supporters of this course of management believe, however, that when labor comes on naturally it may be expedited when the os is fully dilated, but they teach that the duty of the obstetrician is to treat the patient specially from the toxemic, and not from the obstetric, point of view.

It may be objected to the immediate emptying of the uterus in eclampsia (1) that such a plan does not cure all cases; (2) that patients with convulsions and coma have been treated so that they have recovered completely, and have given birth at a later period to living healthy children, all signs of previously existing toxemia having disappeared—the writer has personally had several such cases; (3) that some of the worst and most fatal cases of eclampsia have been those in which the first fit occurred after delivery. The writer used to think, under such circumstances, the prognosis was good; in later years, however, he is much more anxious about cases in which the first fit occurs postpartum. Further, if Cæsarian section is to be done in the case of every woman with eclampsia, surely among them there will be a number who would have recovered with less radical measures of treatment.

It must be conceded, in fairness to those who recommend immediate emptying of the uterus on the onset of convulsions and coma (or either), that any operative measures to do this must not be postponed until other lines of treatment have been tried and have failed, and then employed only as a last remedy; and, further, that the operative method best suited for use at an early stage—Cæsarian section—is done on a patient who is already in a serious condition from a poison circulating in her system. Such a plan cannot be supposed to give anything like the good results it does in the case of a healthy, unexamined woman, in whom the Cæsarian section is the method of delivery chosen beforehand owing to a contracted pelvis.

In Routh's paper "On Cæsarian Section in the United Kingdom," being a report read at the Vme Congrés International d'Obstétrique et de Gynécologic, at St. Petersburg, in September, 1910, he writes: "In 1897 Kettlitz collected 28 cases (in eclampsia gravidarum) with 14 deaths; in 1899 Hillman collected 40 cases with 21 deaths; and Streickeisen, in 1903, added 26 cases with 8 deaths. In the list of cases collected for the purpose of this paper there have been 10 cases with 6 deaths. Olshausen reports three Cæsarian sections in 250 cases of eclampsia with one death. Thus, in 105 cases treated by abdominal Cæsarian section, the deaths were 50, a mortality of 47.6 per cent."

The most recent statistics dealing very fully with Cæsarian section done for eclampsia appear in volume 39 (for 1914) of the Transactions of the American Gynecological Society, and were brought before the annual meeting of that body, held in Boston in May, 1914, by Dr. R. Peterson, in a very able paper, "A Critical Review of Five Hundred Published and Unpublished Cases of Abdominal Cæsarian Section for Eclampsia." These 500 cases represented the work of 259 operators in fifteen countries of the world. Among them there were 174 deaths, or a total mortality of 34.8 per cent, but if they are divided into two classes—(1) those done up to 1908, and (2) those done between 1908 and 1913—the results are markedly different. During the first period—that is, up to 1908—there were 198 cases with 95 deaths, or a mortality of 47.97 per cent. During the second period—that is, between 1908 and 1913—there were 283 cases with 73 deaths, or a maternal mortality of 25.79 per cent, this improvement being due to greater asepsis and to better technique. In making up these figures, 29 out of the 500 cases were omitted because the year of the operation was not given. This was done simply to be accurate. Dr. Peterson believes the mortality percentage of 25.79 per cent can be considerably lowered by care in technique and by not making use of the suprapubic route when there is great probability that the woman has been infected from below.

Excluding premature children and counting all children as living who survived one hour after delivery, there were nine deaths in the series from 1908 to 1913, where 248 children were delivered by abdominal Cæsarian section, or a fetal mortality of 3.62 per cent. Under the same conditions the fetal mortality was 10.69 per cent, if children dying the first three days after delivery be counted among the deaths. As Peterson concludes: "Even estimating the fetal mortality by this method, it is much better than by any other method of treating eclampsia."

Professor Bumm's statistics for the years 1904-9 at the Charité Hospital, Berlin, are as follows: 17.7 per cent mortality in 330 cases; when, however, the uterus was emptied within six hours of the occurrence of the first convulsion the mortality was 8.8 per cent. The fetal mortality was 21.7 per cent. The writer cannot get any of his later statistics.

The alternative method of management of eclampsia aims specially at the treatment of the toxemic condition; no forced delivery is done, but when labor sets in, it is helped. One plan is that employed by Zweifel and Lichenstein, and it consists in bleeding, followed by intravenous salt solution, which is said to give a mortality of less than 7 per cent, while another method, the eliminative treatment of eclampsia, aims, first, at the prevention of the formation of any more toxins; secondly, at the elimination of the toxins which are already circulating in the system; thirdly, at the facilitating of labor at the proper time, if it should come on naturally, no induction of labor being allowed; and fourthly, at the careful treatment of special conditions, such as heart failure, obstruction of the larynx, etc.

This plan of treatment has been called "the Rotunda" method, because it was begun, slowly evolved—step by step—and brought to its present state in that institution, just in the same careful way as the treatment of accidental hemorrhage has been worked out. The plan of campaign for the treatment of eclampsia was started during the mastership of Sir William Smyly; and at the International Congress of Gynecology and Obstetrics, Geneva, in 1896, when the writer was asked to open —from the English point of view—the discussion on "The Treatment of Eclampsia," in the absence of Sir William Smyly, who was then Master of the Rotunda Hospital, and the writer was able to give Smyly's results, which showed a marked improvement on previous methods. His plan was the avoidance of induction of labor, as well as the use of chloroform (except for operative interference), pilocarpine, and chloral. He reintroduced the use of morphine (½ grain at first hypodermically, followed by ¼ grain, as often as is found necessary to control the fits, the idea being simply to keep the convulsions in check; as much as 2½ grains being allowed in the twenty-four hours), and he recommended the placing of the patient on her side (not on her back), with her head low.

Here are Sir William Smyly's statistics which he gave the writer at that time: "There were 30 cases of eclampsia (at the Rotunda), of which four occurred before labor, 22 during and four after delivery. The first seventeen were treated with chloroform; of these six mothers and eleven children were lost. Since 1893 we have abandoned chloroform, except during instrumental delivery, and have had thirteen cases with two maternal and eight fetal deaths; one went out undelivered." It should be stated that it was G. Veit who originally suggested and used the morphine treatment. Before Sir William Smyly reintroduced the morphine treatment the death-rate in the Rotunda Hospital was 35.3 per cent; it fell to 20 per cent during his mastership and that of his successor, Dr. Purefoy, in those cases treated in the way the writer has described. The next chief of the Rotunda Hospital after Dr. Purefoy—Dr. Tweedy—specially elaborated and developed the management of eclampsia, and his very full method of treatment has been, with certain modifications, continued during the mastership of his successor, Dr. H. Jellett. This plan depends for its success on the thorough and careful

carrying out of a series of clearly defined details:

1. To avoid any further formation of toxins, the patient is starved, the stomach and bowels are carefully washed out with warm saline (half to one drachm of sodium bicarbonate to the pint), but in order not to embarrass the heart or breathing, no fluid—after the washing out—is left in the stomach. This gastric and intestinal lavage is employed with the object of removing any toxins, as well as any articles of food taken recently, because Dr. Tweedy teaches very strongly that indigestible food is a most important exciting cause of eclampsia.

2. To eliminate the toxins, the washing out of the stomach and thorough and frequent intestinal lavage are employed, and care is taken that no medicines of any kind are placed in the mouth of an unconscious patient, but two ounces of castor oil, with three drops of croton oil, or some other aperient, are poured into the stomach just before the tube for lavage is withdrawn. Of course, if the patient can swallow, compound powder of jalap, croton oil, compound senna mixture, or calomel may be given in the ordinary way. To the writer's mind, no part of the treatment is more important than the thorough emptying of the bowels, and it often requires an amazing amount of purgatives and frequent intestinal lavage, the rubber tube being passed twelve to fourteen inches until this is accomplished. For the same reason—to get rid of the toxins, to supply fluid to the system, and to act as a diuretic—mammary or venous saline infusion is to be used (especially if after washing out the bowel the urine remains scanty and high-colored), and warm poultices to the loin are employed for the purpose of increasing renal activity, and with the idea of eliminating the poison.

3. Treatment of special conditions. The patient should be always kept on her side (either will do) to prevent mucus and saliva entering the larynx and so adding to the risk of edema of the lungs. Suppose mucus to collect in the throat and signs of laryngeal obstruction to arise, the patient's head and shoulders should be drawn over the side of the bed, her face turned down toward the floor, so as to let any blood or mucus mechanically flow out. Oxygen and artificial respiration are important aids in reëstablishing breathing. During a fit, a gag or handle of a spoon (covered with a piece of linen) should be introduced between the teeth to prevent the patient injuring herself. A cork should never be used, as it is apt to be broken up into small pieces which, if they get into the larynx, may tend to choke the patient. For any signs of heart failure 10 to 20 minims of brandy or whisky may be injected, as well as 1/100 grain of digitalin. No warm baths, or any form of diaphoresis, are recommended. If labor sets in, as soon as the os is fully dilated artificial delivery is to be employed. But the three great points to attend to are (1) to prevent the formation of any more toxin, (2) to get rid of any already circulating in the system, and (3) to treat special complications as they may arise. Dr. Tweedy has kindly given the writer his latest results as follows: He has had 78 cases of eclampsia treated in the way the writer has described, with six deaths—that is, a maternal mortality of 7.7 per cent.

Stroganoff's method—which differs from that of Zweifel and Lichenstein in that no free bleeding is used—is based largely on the same lines as those employed at the Rotunda clinic, with the following additions and alterations:

1. He tries to avoid all external irritation; hence the patient is kept in a quiet, darkened room; no one is admitted except the doctor and the nurse; everything is done silently, and without fuss or noise.

2. If any examination has to be made—external or internal (only if necessary)—if the catheter has to be used, or a hypodermic of morphine has to be given, the patient is allowed to inhale twenty to thirty drops of chloroform.

3. The fits are controlled by a combination of morphine and chloral (giving the latter by the mouth or by the rectum).

4. Labor is assisted, but not forced.

5. The vital processes are to be watched carefully, and to be stimulated, when necessary.

6. For the respiration, pure warm air is to be used, with oxygen after the fits; the patient is to be kept on her side, and careful cleansing of the throat and nose is to be done.

7. For the heart, digitalis and stimulants are to be employed, if it gets weakened, and milk and saline infusion may be given by the mouth or rectum.

8. For the kidney and skin, the best remedies, he thinks, are warmth and saline infusion.

The last statistics the writer can procure show 900 cases reported by Stroganoff, with a 7-per-cent mortality.

When the writer contrasts the clear and precise methods of treatment of eclampsia recommended and employed now with the uncertain plans which were taught and carried out in a doubtful and hesitating way when he began practice, the change is indeed remarkable. Formerly, in our efforts to combat such a serious complication, we had little system or guidance; now we have clear, definite rules to follow; and—what is indeed remarkable—this complete alteration from uncertainty to self-reliance has been gradually brought about, although we still know so little—at least with anything like scientific accuracy—of the real cause of eclampsia. When the obstetrician is faced with a case of eclampsia, occurring after the sixth month of pregnancy, in which there are no signs of the onset of labor, he may decide to follow one of two methods: (1) To deliver as soon as possible, or (2) to use every effort to eliminate the supposed toxin and to prevent the continuance of its formation, at the same time treating any complication as it arises, but avoiding all attempts at forcible delivery, and only interfering obstetrically when, in the course of labor—which has naturally arisen—the indications are clear for successfully helping the birth of the child.

Medical practitioners must, after a careful consideration of all the circumstances and statistics, such as the writer has given, make up their own minds which plan they will carry out. The writer has no hesitation in saying he prefers the second, or what may be called the eliminating, method of treatment, which he has carefully followed out, with some modifications, at the Maternity Hospital, Belfast, during the past eight years, and where of late his results are about the same—from the point of view of mortality—as those of Tweedy and Stroganoff; and where also they have steadily improved *pari passu* with the thorough and careful attention to all the details he has enumerated. To call this method of treatment the morphine plan is to show a very superficial knowledge of what it is—it is really a combination of a series of details, every one of which is the result of close observation, thoughtful care, sound experience, and improved scientific technique. What above all else should be attended to is, the writer believes, starvation and the washing out of the stomach and the thorough lavage of the intestines, until they are both fully cleared out, as well as the prevention of laryngeal obstruction and edema of the lungs, and the control of the fits by morphine. Wherever the poison is elaborated, the writer thinks it is got rid of much more thoroughly and permanently by clearing out the stomach and intestines than by emptying the uterus.

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### THE GERMICIDAL EFFECT OF LACTIC ACID IN MILK.

The *Journal of Infectious Diseases* for May, 1915, contains an article by HEINEMAN in which he reaches these conclusions:

Some acid-tolerant cells of bacillus coli may survive the presence of 0.6 per cent lactic acid in milk.

B. dysenteriæ, B. typhosus, B. diphtheriæ, B. paratyphosus B, and Spirillum choleræ in these experiments were destroyed by the presence of 0.45 per cent lactic acid. It is possible that strains of these bacteria exist which are able to resist a greater amount of the lactic acid.

Acid-tolerant strains of B. coli, B. dysenteriæ, B. typhosus, and B. paratyphosus B may multiply in the presence of quantities of lactic acid which are destructive to the majority of cells. The smaller the initial amount of lactic acid, the more likely is the growth of acid-tolerant strains. Conse-

quently, the slower milk sours, the greater is the danger of pathogenic bacteria surviving.

The growth of the test bacteria is influenced to a marked degree by the amount of acid present. Up to a fairly definite amount of acid there is an increase in the numbers, followed by a decrease, which becomes more pronounced as the amount of acid increases. The amount of acid may increase after the number of bacteria has commenced to decrease owing to the liberation of enzymes.

Acids other than lactic acid are frequently present in buttermilk. Buttermilk, therefore, should be looked upon with suspicion, especially if heavily polluted, unless prepared from pasteurized milk. Still the chances of buttermilk becoming a carrier of infection are much smaller than of raw sweet milk.

The presence of saprophytic bacteria in buttermilk may have some influence on pathogenic bacteria. Whether this influence is favorable or otherwise is difficult to determine by present bacteriological methods.

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## METRORRHAGIA OF THE MENOPAUSE.

In an unsigned communication in the *British Medical Journal* of May 29, 1915, the following statements are made:

Having been called to attend a woman, aged fifty, the writer found her suffering from metrorrhagia of the menopause to a profuse extent. She went about her work till the loss of blood forced her to take to bed from sheer weakness and send for a doctor. The writer tried the usual remedies, including subcutaneous injection of ernutin—all to no purpose. After about a fortnight the condition became so grave that, though unaware whether it had been tried before, he resolved to employ an intrauterine injection of Parke, Davis & Co.'s suprarenal extract, using drachm ij of the solution (as supplied) with drachm vj warm water. A Fergusson's speculum showed a steady stream of blood running from the os. An indiarubber No. 9 catheter supported on a wire belonging to a metal catheter was introduced to the fundus of the uterus and the wire withdrawn. The renal extract was then drawn up into a diphtheria antitoxin syringe. The end of the catheter was next fitted over the nozzle of the syringe and the whole syringeful injected. The syringe held about an ounce. This was followed by immediate improvement, though she complained of continuous cramp all night resembling slight labor pain. Where two large cloths had been soaked every night, one was only soiled in parts the night following the injection. This continued the next day and night, and the following morning, fearing lest it might increase, the writer repeated the injection, this time using the whole ounce, drachm ij P.-D.'s solution to drachm vj water. The discharge then ceased, and the patient recovered.

A Belfast linen catheter would be more easily introduced to the fundus of the uterus, but the rubber catheter was necessary as it required holding down on to the syringe with the fingers to prevent escape of the fluid, the grip of the uterus resisting the injection strongly, which escaped slowly again at the os. The delay caused by the difficulty of getting the catheter into the os, and also the coldness of the weather on both occasions, rendered the solution practically cold.

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## THE VALUE OF ATOPHAN IN GOUT.

The *Lancet* of May 22, 1915, calls attention to the fact that some observations on the use of this drug, which is a diphenylchinolin-tetracarbonic acid, have been recently published by Dr. P. Biffis in *Il Policlinico*. He administered it to five healthy and two gouty subjects in half-gramme doses two to eight times daily, the latter being on a rigorous purin-free diet. In the healthy subjects there was a definite increase in the uric acid eliminated by the urine, which generally reached its maximum in the first six hours, after which it diminished even though the dose was trebled or quadrupled. The increase was not in proportion to the amount of drug

given after the first day, even if the experiment were made in the same individual at different times, and when the administration was suspended there was a diminution, sometimes very marked, in the quantity of eliminated uric acid which continued for two to three days. There was no change in the quantity of urine passed, but it became slightly turbid and high colored and gave a sediment of urates and uric acid, and a trace of albumin was frequently observed. In large doses it was not well tolerated, causing pyrosis, which was not relieved even by full doses of bicarbonate of soda; this digestive disturbance was not nearly so frequent when novatophan was substituted for atophan.

In the two gouty cases the drug was not given in the acute stages, and, taken in conjunction with other observations previously made by him, the author came to the conclusion that the drug was much less active with regard to the elimination of uric acid in gouty than in healthy subjects. It had hardly any action in doses of 1 to 2 grammes, and this may be why some observers have reported unfavorably of the drug. The inertia can perhaps be explained by the fact that atophan acts rather upon the elimination of exogenous uric acid, and is therefore less active in gouty subjects on a diet free from uricogenous substances. With regard to the quantity of urine, the tolerance, and the albuminuria, the same phenomena were observed as in the healthy subjects. The action of atophan is little understood, but it probably consists in the decomposition of a larger quantity of nucleoproteids or in some alteration in those fermentative processes which regulate the oxidation of the purin bases.

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## THE EFFECTS OF ADRENALIN INFUSION ON VASOMOTOR IRRITABILITY.

In the *American Journal of Physiology* of June 1, 1915, HOSKINS and ROWLEY as the result of a series of experiments reach these conclusions:

1. In 44 anesthetized dogs the effects of adrenalin infusion upon the irritability of the vasomotor mechanism were investigated.

2. The vasomotor mechanism was stimulated by faradization of the sciatic and splanchnic nerves, and by injections of nicotine, adrenalin, and pituitrin, before, during and after intravenous infusion with adrenalin.

3. No concentration of adrenalin gave satisfactory evidence of augmenting vasomotor irritability, or facilitating the transmission of vasomotor impulses.

4. In most cases the infusion lessened the vasomotor irritability—sometimes to a marked degree.

5. The animal's own adrenal glands played no significant part in the results.

6. The irritability of both the pressor and depressor mechanisms was decreased.

7. The depression was probably both central and peripheral.

8. Circulating adrenalin is probably not a factor in the ordinary functioning of the animal economy.

[We do not see that adequate evidence as to the correctness of the last sweeping conclusion is adduced.—ED.]

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## HUMANIZED MILK IN INFANT FEEDING.

Writing in the *Medical Record* of May 29, 1915, EPSTEIN says that artificial infant feeding may be divided into three classes: (1) The feeding of healthy infants; (2) the feeding of infants during acute illness; (3) the feeding of infants suffering from some chronic gastrointestinal disease, or poor digestive ability, or intolerance for certain elements in the milk.

In order to feed the average healthy infant there are at present two methods which are commonly used: (1) Simple dilution of whole milk; (2) percentage feeding.

Simple dilution of whole milk is really simple and at times very useful, but babies do not thrive on simplicity alone. Comparing the food value of this simple milk modification with the food value the baby would have received from the breast, especially in the early months of infancy,

the infant is cheated of its food at the threshold of life. Percentage feeding is scientific and a proper food can be prepared by this exact method, but the majority of physicians know very little about it. The result is that many infants, healthy at birth, are made hopelessly ill by all kinds of irrational milk modifications.

Humanized milk—that is, cow's milk with the percentage composition of human milk—can be given to the vast army of healthy babies from early infancy to the end of the first year. It has a scientific basis for its use, and infants fed on this food show a steady gain in every way.

In order to make it available to the average mother or nurse, the writer has much simplified the method of its preparation. The food is prepared from the upper 15 ounces of a quart bottle of milk.

The upper 15 ounces of a quart bottle of milk after standing undisturbed for six hours at a temperature of from 40° to 50° F. has approximately the following percentage composition: Protein, 3.40; sugar, 4.50; fat, 8.00; salts, 0.70; water, 83.40.

When this upper 15 ounces is diluted with an equal volume of water it gives the following percentage composition: Protein, 1.70; sugar, 2.25; fat, 4.00; salts, 0.35; water, 91.70.

On adding sugar to this milk to make up 7 per cent it has the following composition: Protein, 1.70; sugar, 7.00; fat, 4.00; salts, 0.35; water, 86.95.

From the above it is evident that by this simple process of diluting once the upper 15 ounces of a quart bottle of milk you obtain a food that is very near to human milk.

| *Human Milk.* | | *Humanized Milk.* | |
|---|---|---|---|
| Protein | 1.50 | Protein | 1.70 |
| Sugar | 7.00 | Sugar | 7.00 |
| Fat | 4.00 | Fat | 4.00 |
| Salts | 0.20 | Salts | 0.35 |
| Water | 87.30 | Water | 86.95 |

Having decided by the weight, age, and general condition of the infant how many ounces of food it requires at each feeding and the number of feedings in twenty-four hours, the mother or nurse is directed to use the upper 15 ounces of one or two quart bottles of certified raw milk, and out of these 15 or 30 ounces of milk she takes as many ounces as she is directed, and to this she adds an equal number of ounces of cooled boiled water, to which the proper amount of milk-sugar has been previously added. The entire quantity of food, which is made up of half milk, half water, and sugar, is now equally divided into the number of feedings required and fed at regular hours.

The feeding of infants during acute illness, or of those suffering from chronic digestive disturbances or intolerance for certain elements in the milk, requires individual study to adapt the food to the baby's condition.

Humanized milk is not intended to replace human milk; though it approximates it very closely in the percentage of solids, there still remain the chemical and biological differences which cannot be changed by any known means. Neither is humanized milk suggested to replace the more scientific and exact method of fitting the food to each individual baby which is the aim of the pediatrist. But it is recommended as a very useful food for the average healthy infant who is under the care of the busy, practical general practitioner of medicine whose daily work among his little patients offers great opportunities to do much good.

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## THE CURE OF GOITRE BY THE INJECTION OF BOILING WATER INTO THE SUBSTANCE OF THE ENLARGED THYROID.

In the *Medical Record* of May 29, 1915, WYETH reports on this method. He reminds us that at the meeting of the American Medical Association in New Orleans, in 1903, the writer first made public the curative effect of water, at a high temperature, injected into the substance of otherwise inoperable angiomata, and that in the discussion which ensued it was suggested that the method would prove equally efficacious in the treatment of goitre. A number of successful cases have already been recorded, especially by Dr. Porter of Fort Wayne, Indiana, and Dr. Reder of St. Louis.

The technique employed in a recent case at the Polyclinic was as follows: The skin and the area to be injected were thoroughly anesthetized by the injection of a free quantity of a one-half of one-per-cent novocaine solution. One of the writer's steel syringes, taken out of the boiling cauldron, was filled with boiling water, which was immediately injected by inserting the needle well into the substance of the mass. To prevent scalding the skin, as heretofore advised, the contiguous surfaces are shielded by a covering of towels, leaving only the point of injection exposed. As the steam or water is apt to escape from the needle as it approaches the skin, a gauze swab is held as a shield in front of the needle, which latter is thrust through and into the skin, when the contact is made. From 10 to 20 minims are forced out in one spot. The needle is then partially withdrawn, and the point carried to a new field, and the injection repeated. Three or four such areas may be injected at one sitting, and these may be repeated as required, in one or two weeks, and so on, until the tumor disappears.

In the case in question five injections were made in ten weeks, and in three months the goitre had entirely disappeared. The pain was insignificant. There is very little danger of having the water too hot. A Bunsen burner or an alcohol lamp held under the barrel of the syringe just as the needle is being inserted will insure a high temperature. It is advisable not to have the point of the needle immediately under the skin, as the excessive heat so directly applied may produce necrosis, which is apt to become a point of infection. If the skin covering remains intact, all tissue coagulation or destruction, being aseptic, is harmless, and the solidified mass gradually disappears by granular metamorphosis. It goes without saying that important vessels and nerves, as well as the trachea, should be avoided.

The writer has used the method now in a large number of angiomata since its introduction, nearly fifteen years ago, and has never had a fatal result or accident beyond some slight burnings of the cuticle. In a single instance, as a precaution, he threw a temporary occluding ligature around the common carotid and the internal jugular. The great heat of the injected water, although seemingly in immediate contact with these vessels (in the case of a very large venous angioma of the neck, just below the jaw), caused no coagulation, and the ligatures were removed.

In the demonstrations at the writer's clinic he often uses the ordinary glass hypodermic syringe, which, being gradually heated with the water, will not break.

He is of the opinion that the majority of goitres can be cured by this simple method. So far he has gratifying results in every case of venous or arterial angiomata. The capillary form (mother's mark), especially those on the face, always undergoes more or less necrosis and infection, and while the vascularity is arrested, a secondary operation to secure a linear cicatrix is usually necessary.

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## ACTION OF SUPRARENALS ON RENAL SECRETION.

In the *Proceedings of the Royal Society of Medicine* for April, 1915, DOUGLAS COW concludes as the result of his investigations that the products of suprarenal activity which under certain conditions find their way directly to the kidneys produce—

1. Shrinkage in size of the kidney.
2. Abrupt diminution of urinary flow.
3. Contraction of the capsule of Bowman on the glomerular tufts.
4. Constriction of the uriniferous tubules.

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## EFFECT OF DIGITALIS IN EXPERIMENTAL AURICULAR FIBRILLATION.

In an endeavor to decide this subject HIRSCHFELDER in the *Journal of Pharmacology and Experimental Therapeutics* for May, 1915, states he made experiments in which the hearts of dogs and cats were exposed under artificial respiration, a special electrode was applied to the right auricle, and the auricles were faradized continuously throughout the experiments with

stimuli sufficiently intense to keep them in continuous fibrillation. This induces the typical arrhythmia so commonly met in clinical practice. Since this arrhythmia gives the most striking examples of improvement under digitalis that are met with in clinical medicine, it was attempted to determine whether this action could also be shown in the experimental condition so as to furnish a striking experiment for class work in pharmacology. It was found that the irregularly beating heart under these conditions was very markedly slowed by digitalis, and also was promptly returned to rapid arrhythmia by paralyzing the vagi with atropine, just as Mackenzie had shown upon patients. Section of either vagus accelerated the rhythm but not as much as atropine; while stimulation of either vagus gave slowing. No marked preponderance in favor of the left vagus could be established. With very large doses of digitalis further gradual slowing of the rate could be obtained after the vagi had been paralyzed with atropine; and complete block marked by a slow, regular rhythm of the independently beating ventricle could be induced, even though the auricles were still visibly fibrillating. After this block had set in, increasing the intensity of the faradic stimuli to the auricle caused the arrhythmia to set in once more; decreasing its intensity caused block to reappear. Evidently strengthening the myogenic impulses in the auricular fibers enabled them to cross the His bundle, whose conductivity had been diminished by the digitalis.

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## "DO'S" AND "DON'TS" IN THE DIAGNOSIS OF EARLY PULMONARY TUBERCULOSIS IN ADULTS AND CHILDREN.

HAWES gives these "Do's" and "Don'ts" in the *Boston Medical and Surgical Journal* of May 20, 1915:

1. Take a careful history of your patient.
2. Remember the paramount importance of constitutional signs and symptoms.
3. Remember that loss of weight must be satisfactorily explained.
4. Loss of strength and energy.
5. Do not forget the importance of undue fatigue and ease of tire.
6. Continual or occasional evening fever must be explained.
7. Remember the importance of a subnormal temperature accompanied by a high pulse.
8. Remember that a hemorrhage is evidence of pulmonary tuberculosis until the contrary is proved.
9. Bear in mind that pulmonary syphilis is not so uncommon as it is supposed to be.
10. Remember that early cases of exophthalmic goitre may simulate early pulmonary tuberculosis in every way.
11. Depend more on your thermometer, your history and constitutional signs and symptoms than you do on percussion and auscultation.
12. Remember to use your common sense.

1. Don't be in too much of a hurry.
2. Don't forget to strip the patient to the waist.
3. Do not expect to find marked signs in the lungs in every case.
4. Do not wait for a positive sputum.
5. Don't forget that practically all pleurisies, wet or dry, of idiopathic origin, are tuberculous.
6. Don't forget to look elsewhere than the lungs.
7. Don't base your diagnosis on *x*-ray evidence alone.
8. In adults do not place any value on the skin tuberculin test, whether positive or negative.
9. Don't forget the chronic bronchitis, influenza, bronchiectasis, emphysema, asthma, and other chronic and subacute lung conditions still exist and will continue to exist, and that they often resemble pulmonary tuberculosis.
10. Don't forget that the reverse of the above is also true.
11. Don't forget that people may be run down, tired, weak, etc., without having consumption.

In children:

1. Remember the difference between tuberculous infection and tuberculous disease.

2. Remember the frequency of tuberculous infection.

3. Remember that in children tuberculosis is primarily a disease of the glandular system.

4. Remember the importance of exposure, and that bovine as well as human sources are of importance.

5. Remember that in children by the time the lungs themselves are involved, the disease is far advanced.

6. Remember the importance of constitutional signs and symptoms.

7. Remember that, while in adults there is no cough characteristic of tuberculosis, in children there may be present a cough which is more or less characteristic of bronchial gland enlargement.

8. Remember that a positive skin tuberculin reaction is of infinitely greater importance in children than in adults.

9. Remember that the *x*-ray in children may show enlarged bronchial glands, but that it does not prove these glands to be necessarily tuberculous.

1. Don't fail to realize the responsibility you are taking in stamping a child as tuberculous.

2. Do not forget in cases of doubt that it is possible, and far better, to institute proper treatment without casting the stigma of tuberculosis.

3. Don't make up your mind beforehand as to what you are going to find.

4. Don't forget that while a positive d'Espine sign is good evidence of enlarged mediastinal glands, it does not prove that they are tuberculous.

5. Do not expect to find marked signs in the lungs in every case of bronchial gland enlargement.

6. Don't forget that processes due to influenza, the pneumococcus, and other organisms are common in children, and are often mistaken for tuberculosis.

7. Don't forget that improper feeding, diseased tonsils, and increased adenoid tissue, a chronic middle ear, and other conditions may simulate tuberculosis.

8. Don't forget that your diagnosis rests, not on one or two striking signs and symptoms, but on an accumulated mass of simple details.

9. Do not forget to be frank and open with the parents, and to explain to them the exact situation.

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### MUMPS.

FEILING in the *Quarterly Journal of Medicine* for April, 1915, reminds us that no known remedy is available which has any direct control over the course of this disease. In all cases rest in bed should be insisted upon till all the swelling of the glands has disappeared; in this way complications possibly may be averted. In adult males this injunction is specially important; to avoid orchitis rest in bed should be enjoined for at least eight days; even then a certain number of cases will probably be affected by it. The usual principles as to diet, regulation of the bowels, and a gradual return to the duties of ordinary life hold good as in other febrile diseases. The complications are dealt with symptomatically as they arise, and call for no special treatment beyond that commonly prescribed.

Three weeks may be taken as an ample period of isolation.

In all epidemics strict isolation of cases should always be provided where possible.

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### THE TREATMENT OF INFECTIOUS ENDOCARDITIS.

In the *Journal of the American Medical Association* of May 22, 1915, EBRIGHT tells us that in his opinion, in the matter of treatment, the ultimate result to be expected in any case of endocarditis would depend largely on the degree and virulence of the inflammatory processes. It is advisable to reduce the work of the heart to a minimum by means of absolute rest, regulation of diet with a view to preventing distention of the stomach and colon, and eliminating as much as possible a rise of blood-pressure by the avoidance of hearty meals, use of the ice-bag, etc. The matter of rest is the most important of all. In fortunate cases this will result in a short time in diminution of

the cardiac dilatation and will bring about conditions that most favor the subsidence of the inflammation. It is to be borne in mind that rest must be carried out with the utmost rigidity and the patient left as much as possible to the care of a suitable nurse. It is seldom desirable to separate a child from its parents, but the fewer people that enter the room the better. During the stage when inflammation is still present passive movements and massage have no place in the treatment. These measures, however, are of benefit when it is felt that the inflammatory process has disappeared and the myocardial irritability has sufficiently subsided.

The great aim in the treatment of such mild cases as here detailed is to prevent the increase of cardiac inflammation to such a point that there is the full painted picture of infectious endocarditis with its hopeless prognosis, and also to obtain a recovery before inflammation of a valve has gone to the point of such destruction as will result in scars of the valve segments and sooner or later a cardiac cripple. To that end it must be insisted on that the patient remain in bed a sufficient length of time, and a safe minimum is three months. Broadbent points out that a child with endocarditis dies, as a rule, before it attains adult life, especially if it does not receive that care which insures a complete subsidence of the inflammation, which may smolder for months, and a return of the heart to its normal size, also until the myocardium has lost its abnormal irritability and has regained such a sufficient margin of reserve strength as will prevent dilatation on slight provocation and will enable it to bear the burdens that a careless person may impose on it. Experience seems to teach that in adults acute endocarditis complicating inflammatory rheumatism is in many instances a very benign disease, recovery taking place in a much shorter time than is the rule with children. Valves already injured by previous inflammation present greater obstacles to a cure than inflammations occurring for the first time.

The use of vaccines is not unattended with danger. In the first place the patient is already generating toxins theoretically sufficient without the addition of artificial vaccines. Again, when large numbers of bacteria are found in the blood, the use of vaccines may be attended with a reduction of the number of bacteria by destruction, but there are liberated at the same time toxins which result in an increase of the leucocytes and fever and a lowering of the condition of the patient. The same thing results in the use of foreign serums. It appears that the invading organism immunizes itself against the antibodies in the blood of the patient, so that when foreign serum is introduced, although the number of bacteria may be diminished, the net result for the patient is bad.

The use of cardiac stimulants is unnecessary so long as the proper amount of cardiac work is being performed, and it would seem rather advisable as long as possible to avoid stimulating the myocardium, already more or less degenerated from bacterial poisons, as the great desideratum is cardiac rest, not work. It is not to be denied that the use of small doses of digitalis may become necessary, but it will be observed that the heart muscle in endocarditis is very susceptible to the action of stimulants, and even small doses of digitalis, for instance, may produce an irregularity not present before and which disappears on the cessation of the drug. Not only that, but in the presence of vegetations stimulation may cause a dislodgment and troublesome embolus.

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## THE APPLICATION OF STRONG ANTISEPTICS TO INFECTED AND NON-INFECTED WOUNDS.

Bond (*British Medical Journal,* March 6, 1915) states that the good results which have followed the thorough application at the earliest possible moment of some efficient germicide to wounds which, from their nature and surroundings, are almost certainly infected, has already tended to allay the feeling of hesitancy with which at the beginning of the war surgeons adopted an antiseptic as opposed to an aseptic line of treatment.

Inasmuch, however, as some apprehension may still exist as to the degree of injury which such applications inflict on the cells and tissues of the body, Bond feels prompted to record some observations which he has recently carried out, primarily with the object of satisfying himself as to the capacity of tissues to heal in the presence of strong antiseptics, and he ventures to hope the facts so recorded may be useful at the present time.

In order to state with confidence and accuracy the effect of the application of strong germicides like carbolic acid or iodine to wounds in general, it is necessary to simplify the problem and first ascertain the effects of such reagents on wounds in which the possibility of the presence of disease organisms has been excluded.

He has therefore recently taken advantage of the opportunity afforded by a series of operations for hernia, varicose veins, etc., on recruits rejected for physical disability, to treat in a few cases the extensive incisions made for the removal of varicose veins in the leg and thigh in the following way:

The preparatory treatment which is generally used in the aseptic method is first carried out.

In one leg the wound left by the long incision on the inner side of the calf, which may measure 6 or 8 inches in length and (after the necessary dissection) 3 or 4 inches in width, was well rubbed over with pure carbolic acid until the tissues assumed the dirty-white appearance characteristic of the reagent.

In the other leg of the same patient the corresponding incision was treated with tincture of iodine (B. P. strength).

In other patients, out of a number of incisions on the same limb, one was treated with pure carbolic, one with tincture of iodine, one with mercury perchloride lotion (1 in 1000), and one with carbolic acid lotion (1 in 20), and the other incisions with no antiseptics at all.

The edges of the wounds were coapted in all cases by Michel's metal clips, and all were dressed alike with plain white sterilized gauze, wool, and bandage.

The only difference that could be ascertained in the patient's own sensations after recovery from the anesthetic was that incisions treated with carbolic acid smarted rather less than incisions treated with iodine.

There was little or no difference, as far as painful sensations were concerned, between wounds treated with and those treated without antiseptics; such slight irregular differences as were present might well be accounted for by entanglement of delicate nerve endings in the ligatures.

In regard to the more important point of the influence of such antiseptics on the healing of the wound, it is usually impossible to tell from the appearance of the line of the incision or the condition of the parts, after the removal of the dressing on the second day, or at a later period, which of the wounds had been treated by one method and which by the other. All healed by primary union without undue local reaction or any elevation of temperature in the ordinary way.

Bond has ascertained that the initial application of a strong antiseptic, like pure carbolic acid, does not materially prejudice the healing of a wound in which the injury to the tissues by mechanical means has been moderate, and from which organisms have been excluded. Can we apply this conclusion to wounds in which the damage to the tissues is much greater, and into which pathogenic organisms have been introduced either at the time of injury or shortly afterwards? In other words, we want to know whether the application of a strong antiseptic to an infected wound materially adds to the difficulties of the defensive cells in their struggle with the disease organisms on the one hand, and in their effort to remove cell débris and regenerate new cells on the other. The problem is one of balance of advantage. If the antiseptic destroys or inhibits the growth of the invading organisms, it certainly promotes healing, even if it kills a few more tissue cells. If, however, it damages a considerable number of defensive cells and fails to destroy or inhibit the growth of the disease organisms, it will do more harm than good.

One fact which emerged from these observations is that all the antiseptics—carbolic, iodine, and mercury—when used in freshly made aseptic wounds seem about on a par as regards their influence on the healing of the wound.

If the conditions were the same in a wound as in a culture tube the best form of antiseptic would have been decided in the laboratory long ago. The free use of almost any antiseptic in sufficient concentration will (apart from the question of spores) destroy or inhibit the growth of most organisms when these are present only on the surfaces, internal and external, of the wound. Hence the divergent views as to the germicidal power of different antiseptics, a divergence of opinion which indicates that in surgery as in medicine the complete control of and the curative remedy for infection in all its phases has not yet been arrived at.

We do not fully know the length of time after infection within which the application of an antiseptic to a wound holds out any prospect of doing good. Hence it is probably wise to make one efficient application of a sufficiently strong antiseptic even in doubtful cases.

If, in addition to the removal, at the proper time, of foreign bodies, bone fragments, etc., and the establishment of free drainage, one such thorough application fails to check the spread of the infection, then it is not very likely that the repeated use of weaker solutions will have a better result. Experience shows that this is true in a general sense, and under these conditions reliance must be placed on stimulating the defensive mechanism of the body by vaccines and in other ways.

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## RADIUM AND X-RAY TREATMENT OF MALIGNANT TUMORS.

Von Eiselsberg (*Archiv für klinische Chirurgie,* Bd. 106, Heft 1) sums up his experience with radium and *x*-rays in the treatment of malignant tumors by saying that on account of the superficial action of radium as compared to the *x*-rays it should not be used instead of the latter in deeper lying tumors. In cancer of the tongue, esophagus, and rectum the best results are obtained by the combined use of both. It is also advisable to remove as much of the tumor as possible by operation before the rays are applied. So far as radium is concerned much study is yet required in regard to its proper use. It still remains true that whenever cancer can be cured by operation this should be done. We must still await a decision as to the permanency of results from radium and *x*-ray treatment, but the results with the *x*-rays have been so surprising as to justify our being hopeful.

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## PILO-NIDAL SINUSES.

Le Cron (*Wisconsin Medical Journal,* March, 1915) describes the sacrococcygeal sinus, or the postanal dermoid, which is found in the midline over the sacrum. The closure of the medullary groove in the embryo begins in the cervical region and spreads forward and more slowly backward, so that the anterior end of what then becomes the medullary tube or canal achieves considerable differentiation before the posterior end of the canal is closed. Near this point of late closure of the caudal or terminal end of the neural canal, ectodermal cellular inclusions account for the origin of these postanal dermoids or sinuses. The filum terminale, which results from the more rapid growth of the spinal column than of the spinal cord, perforates the meningeal covering in about the midsacral region, and then becomes attached to the periosteum at about the sacrococcygeal junction. In this region the subcutaneous tissue is scant, so that the epidermis may be attached directly to the periosteum, and in 20 to 30 per cent of cases a definite sacrococcygeal or postanal dimple is found. In the general examination of cases at the Children's Hospital sacrococcygeal dimples are frequently noted, and especially in cases showing congenital defects deep pits or dimples in this postanal region have been observed. A fibrous, cord-like, subcutaneous thickening may sometimes be felt leading upward from the dimple.

The simple pilo-nidal sinus varies in

length from the fraction of an inch to several inches. It is more or less in a straight line, running up the back in the midline superficially over the sacrum, with a small pinhead-sized external opening about over the sacrococcygeal junction. The complicated forms may have several openings not necessarily in the midline, and the sinus tracts may branch and be very tortuous. Ordinarily the sinus tract is lined with true epithelium, which may contain hair follicles and sebaceous glands, and thus at times retention cysts are formed, which are filled with caseous material, cellular detritus, and hairs, from which elements symptoms may arise if the part is subjected to irritation or trauma, when infection and inflammation set in, and result in abscess formation.

The patients are usually young adults, who give a history of a painful postanal swelling, from which there may be a more or less constant discharge of a watery, sebaceous, or purulent character. In some cases no definite swelling such as the retention cyst or abscess formation is observed, although intermittent discharge from the sinus produces the discomfort of moisture and irritation of the local area, and in practically every case the skin irritation and tenderness are the chief complaints. Such discharge and discomfort may be tolerated for years, although usually the individual seeks relief much sooner, for the continued itching and rubbing may produce sufficient trauma to the parts to start infection, which often sooner or later sets in. The patient then consults a physician, who if not alert to the possibilities will treat the condition as a simple abscess formation, and then later be at loss to explain why the part does not heal; and often a diagnosis of tuberculosis is then made.

In some cases the diagnosis is obscured, and unless the relative frequency of this condition is kept in mind, a sacrococcygeal dermoid or sinus may be confused with anal fistula, ischiorectal abscess, tuberculous sinus, and other more unusual conditions, but with a complete history and careful examination, differentiation should not be difficult. The proper treatment unquestionably is surgical, whereby the sinus tract must be carefully dissected out and completely excised to effect a permanent cure.

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### SACROILIAC STRAIN.

CORLEY (*American Journal of Obstetrics*, April, 1915) states that the clinical pictures presented in cases of sacroiliac strain are not always clearly defined. Locally, pain in the back is the one symptom common to most cases. This may be so slight that its effect is largely shown in the disposition, as the patient is suffering from a continuous irritation, or it may so completely disable as to prevent getting out of bed. Beginning with a slight relaxation there is an increase of pain and disability as the arc of motion in the joint increases. In an incipient case there will be complaint following any movement requiring use of the lower spinal or sacral muscles, as a sitting posture, stooping, or any condition in which a relaxation occurs. Frequently patients will complain that on waking from sleep after a night's rest the lower part of the back aches, which can be relieved only by lying on the back, or by placing a pillow at the back, or by getting up and stretching or otherwise getting the joints in proper relation. Sleeping with too high a pillow or with no pillow may cause a strain producing the same condition. At other times, instead of giving relief, any attempt to change position on waking causes exquisite pain and at times complete inability to even make the attempt. This loss of power of movement is illustrated by a case. Referred pains are caused by irritation of the lumbosacral cord and consist of tiring, aching, and rigidity of certain muscles or groups of muscles receiving branches from the sacral plexus. These conditions are brought about both by a protective action on the part of the muscles and direct nerve irritation.

Objectively, symptoms of pain and tenderness can usually be elicited by deep pressure over the joint; movements of the joint; rocking or compressing the ilia; by flexing the leg with knee extended, while with the knee flexed no discomfort is felt.

Many pregnant women have symptoms which, while not severe, are yet sufficient to make them miserable. In fact, many of them have the idea that the pregnant state is attended by a certain amount of pain and discomfort which must be borne, and so bear in quiet rather severe pain from sacroiliac relaxation which could almost certainly be relieved by the medical attendant if he but knew of the condition and realized the efficacy of treatment.

Prognosis in so far as relief is concerned is good at all times. In cases occurring in nulliparous women and rendered acute at each menstrual period, and in cases occurring or continuing postpartum, a cure or complete relief can usually be promised. In pregnant cases a cure need not be expected until after parturition. In all cases the general condition, station in life, and mental poise of patient must be carefully weighed, and due notice given that treatment does not always immediately relieve conditions, and that an absolute cure may not be effected for months or years. even though proper treatment be instituted.

Treatment consists primarily of fixation of the joints. Rest is of valuable assistance, yet, if rest alone is used, we will be chagrined to find our patient getting up from bed after a week or so of apparent recuperation only to find the symptoms returning immediately or shortly after assuming the erect posture. Massage over joints and muscles affected is of great assistance, as is also the application of heat.

The plan Corley had always worked upon and which has given uniformly beneficial results is first to apply a dressing of adhesive plaster. The adhesive plaster is torn into strips of about 2 inches in width and length to be determined by size of patient. It should be long enough to reach from just posterior to the anteroposterior median line about on a level with the iliac crest, downward across at a level of the great trochanter of the femur. It is important that the strips do not extend anterior to the anteroposterior median line for the reason that great discomfort is attendant upon the drawing action across the abdomen. In applying strips, the patient should be in the prone position on a flat, hard bed. Securely attach one end, either by having the patient place a hand on it or having an assistant hold it; then grasp its free end with the right hand, pulling forcibly, making counter-pressure with the left hand against the ilium, at the same time bringing the free end of plaster in contact with the skin. This is done alternately from side to side, each strip overlapping the preceding by one-half. When finished, we have a dressing spreading fan-wise on each side and converging over the sacroiliac joints. This fan-shape gives the greatest area of traction possible and holds the joints stiff, preventing the excess motion which is the cause of the disturbance. The uses of this dressing are threefold: First, it gives relief from pain and permits patient to go about; secondly, it acts in many of the cases of lesser severity as a curative agent; thirdly, it is a valuable diagnostic measure. On account of the irritability of the skin, in some cases, it is not practicable to renew this strapping. In others it may be renewed sufficiently to effect a cure.

When patient is relieved from pain and disability by such a dressing the diagnosis is clear, and arrangements should be made for a permanent dressing of one of the following sorts. The most common is the sacroiliac belt, made to measure of patient, 3 inches in width, either of sole leather lined with kid or of webbing, and worn round the hips midway between the iliac crests and great trochanters of femur, with perineal straps to keep the belt from riding up. A corset belt is sometimes used. In this dressing the belt is built on the lower edge of the corset, otherwise it is similar to the simple belt. A stockinet or elastic pair of trunks is sometimes used, and in some cases is all that is needed. In the more severe cases postpartum, a plaster-of-Paris dressing is sometimes used with great benefit. In any of the above dressings an auxiliary pad one or two inches thick conforming to the size and general shape of the sacrum is placed inside the belt just over the sacrum. This acts by making pressure on the sacrum, forcing it forward into its proper position.

### IMMUNITY IN TUBERCULOSIS.

BALDWIN (*American Journal of the Medical Sciences,* June, 1915) after a careful study of this subject concludes that there is no natural immunity to tuberculosis in warm-blooded animals to the types of bacilli found in the bovine or human race.

There is considerable variation in resistance in some species, probably due to the chemical effect of their secretions or physiological differences in the animals, but chiefly to the fact that the bacillus has not become adapted to long-continued parasitic existence in them.

In the human species no natural immunity is found in any race. All uncivilized races long removed from infection are very susceptible, but the white races, especially the European Jews, have acquired a certain degree of immunity by inheritance and almost universal infection. The rapid increase of intercourse between all lands and races facilitates the universal spread of tuberculosis, which is certain to occur through the medium of numerous bacillus "carriers."

The ultimate survival of those who acquire a relative immunity will tend to diminish the severity of the disease, but many generations may be required to accomplish this.

The opportunities for infection, now universal in cities, will diminish gradually in civilized lands by lessening the danger from advanced cases, also from bovine sources. For many years, however, the number of "carriers" will increase owing to improved care, longer life, and higher standards of living among the people.

The best degree of resistance against tuberculosis that has been attained by experiments on the lower animals involves inoculation of living bacilli. This is of little value because of short duration of the protection and the danger of sequestered bacilli.

The natural infection of human beings takes place largely in childhood and increases the resistance to subsequent disease in a large measure. Under improved care of the tuberculous and better hygiene the amount and frequency of severe infections should diminish, while the number of those with slight, relatively harmless infections should relatively increase.

Adults withstand exogenous reinfection under extreme exposure, partly on account of slight infections in earlier life and favorable occupations, environment, and nutrition.

The specific immunity acquired from natural infection is largely due to cellular reactions of bacteriolytic nature, which take place outside the blood-stream for the most part.

The interaction between the ferments of the body cells and those of the bacillus leads to heightened activity of the lytic power, both lipolysis and proteolysis.

The tuberculin sensitiveness or "allergy" is the chief indication of specific resistance. In the patient most of the inflammatory symptoms are due to the actively working immunity functions.

In the therapy of tuberculosis this principle should be applied, to avoid interference with nature's powers of resistance when she is attempting to localize the infection with apparent success.

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### ARTIFICIAL IMPREGNATION.

PROCHOWNIK (*Centralbl. f. Gynäk.,* 1915, xxxix, 145) says that in the course of a practice covering several decades he has made upon 13 individuals twenty-one attempts at artificial fertilization, with three successes. He emphasizes strongly the necessity for a thorough examination of both husband and wife, not only from the point of view of their general physical and sexual development, but also entering somewhat into the psychic field. Having determined the presence of apparently living spermatozoa in the seminal fluid of the husband, and the absence of mechanical obstructions to conception in the wife, Prochownik says that he now always demands permission for at least two attempts before undertaking artificial fertilization. The best time for this he considers between the fifteenth and twenty-second day after

the beginning of the preceding menstrual period. He lays great stress on the importance of carrying out all procedures quickly, deftly, and without undue fuss and elaboration. He uses the ordinary Braun intra-uterine syringe, which should be warm and dry. Coitus is permitted with a condom; immediately following this, the seminal fluid is drawn into the syringe from the condom, and not more than 0.5 Cc. injected into the uterine cavity (not merely into the cervix), the remainder being placed upon a sterile tampon against the external os. The woman is kept in bed for about an hour and a half, after which the tampon is removed, and she is allowed to resume her normal activities. Prochownik thinks that the mental attitude of the patient is of equal or greater importance than refinements of technique, hence the importance of a second trial if the first does not succeed, since the patient is apt to be much less nervous and frightened than at the first attempt.

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### TRENCH FEET.

STRUTHERS and WILKIE (*Edinburgh Medical Journal*, April, 1915) state that no satisfactory term has yet been suggested to apply to the condition of the feet which has incapacitated so many of the troops who have been engaged in the entrenched warfare in the north of France during the winter months. The ready-made term "frost-bite" is that most generally applied, but it is evident that the condition in many respects differs from that which occurs in those who have been exposed to intense cold for prolonged periods. During the present campaign the frost has not been intense, and although the weather has been extremely trying, this has been chiefly due to heavy falls of rain and sleet accompanied by high winds. The temperature has seldom been much below freezing-point, and the men have not had to stand in snow for long periods.

The affection of the feet which has accounted for so much disablement among the troops in the present campaign is not the frost-bite with which we have previously been familiar. It is an interesting fact, by the way, that the fingers, nose, and ears are almost never implicated, while in true frost-bite they very often are.

It is generally conceded that in the causation of the condition cold is only one factor, and that prolonged soaking of the feet in water and mud is another. It seems probable, however, that compression of the limbs and feet by gaiters, puttees, and tight boots is the determining factor, by interfering with the circulation of the feet. Under these conditions degenerative changes occur in the endothelium of the capillaries and smallest arteries and veins, and admit of serum escaping, giving rise to edema. It is possible also that the structure of the peripheral nerves is altered by coagulation of axis cylinders.

Experience has shown that the condition may be met with at different stages or in different degrees, in some cases the symptoms being purely subjective, while in others there are obvious morbid appearances in addition.

In the earliest stage the feet appear normal, but there is cutaneous anesthesia and analgesia. In some cases there are patches of hyperesthesia. The anesthesia chiefly affects the toes and the heel, while the arch and sides of the foot are hyperesthetic. The deeper parts are often painful on movement or pressure. The present writer has met with a number of cases in which the patients complained of severe cramp-like pains in the sole of the foot, particularly at night. These patients, who had been for long in the trenches, were under treatment for wounds of varying severity and not for the condition of the feet, and they were all peculiarly nervous and sleepless. The pains were relieved by bathing the feet in warm soda solution and by gentle massage.

In more advanced stages the condition of the feet alone is sufficient to incapacitate the patient. The feet are swollen, of a bluish-red color, sometimes with large, blackish-brown bullæ here and there. There is marked edema, which may extend

well up the leg, reaching even to the knee. The foot is anesthetic, but there is pain in the leg. When the bullæ burst a purplish area is exposed, which later becomes gray and undergoes necrosis, the superficial slough being separated in a few days. One or more toes, usually including the great toe, may become gangrenous, and gradually be thrown off. In exceptional cases the necrotic process spreads to the deeper tissues of the foot, and tunnels, lined with grayish, sloughy material, form in various directions.

Considerable attention has been directed toward devising means for preventing the development of "trench-feet." The men have been instructed to avoid the tight application of puttees, to leave the laces of the boots slack, and to take care that the boots are not rendered too tight by the wearing of extra socks. As it is impossible to keep the feet dry for any length of time under existing conditions, attempts have been made to protect the limbs against the action of the water by smearing them with grease or vaselin. Piedallu (*Bull. de l'Acad. de Med.,* Jan. 26, 1915) gives conclusive evidence of the value of this precaution. He has collected information from various medical officers who have instituted the practice amongst the troops under their directions, and they all agree that the gelures have diminished in number and that the cases observed have been less severe. One soldier inadvertently performed an interesting experiment by applying the grease to one foot only. This foot escaped while the other was badly frost-bitten. Another proof was afforded by the fact that among a number of soldiers occupying the same trenches, those who had greased the feet did not suffer, while those who had not did.

To obtain the best results it is necessary to smear the feet thoroughly and to saturate the socks and the lower part of the drawers with the grease, and as this requires about 400 grammes of grease, it is necessary to insure a ready supply on the spot. This Piedallu has done by making up an ointment composed of 90 parts suet, 8 parts oil of ox foot, and 2 parts petroleum. The practice amongst British soldiers is, after washing and drying the feet, to smear them with whale oil or some other animal grease, and then to put on dry socks and boots. After leaving the trenches the feet are washed in cold water and dry footgear is put on.

Francois Debat recommends the practice of simple exercises as suggested by Jacquet under the high-sounding name of "la methode biokinetique." The soldier is warned to avoid standing long in one position in the trenches. On the first sign of numbness he should actively move his feet to stimulate the circulation. As a simple means of effecting this, he suggests that, acting in pairs, neighboring soldiers should alternately kick the soles of one another. Two minutes of this interesting game, he says, will warm up the feet. All constriction of the legs and feet by puttees or tight socks must be avoided. He also recommends the application of grease to the feet.

For the milder degrees the treatment consists in thorough cleansing of the feet, keeping the patient in bed with the feet raised on pillows and protected from the weight of the bedclothes by a cage, applying a dry, non-irritating dusting powder, and a covering of cotton-wool. As the swelling subsides gentle massage is used.

Debat reports favorably on the biokinetic method of Jacquet, which, in plain language, aims at reëstablishing a normal circulation by means of massage and exercises. Massage has always been employed in the treatment of frost-bite since Larrey recommended rubbing the frozen parts with snow. To carry out the appropriate exercises, the patient lying on his back raises the limbs to a convenient height, and then alternately flexes and extends the ankles and the toes rapidly and energetically for about five minutes. This is repeated every few hours, and in the interval he remains in bed with the feet supported on pillows or the foot of the bed on blocks. Unless the frozen parts are blistered or ulcerated no dressing is required, but the weight of the bedclothes should be taken off the feet

by a cage. When the skin is broken, in addition to applying the principles involved in the above methods, local applications must be employed. There seems no consensus of opinion that any one application is of special efficacy, but in different hands peroxide of hydrogen, zinc sulphide lotion, ichthyol, and other preparations have given satisfaction.

When gangrene supervenes amputation may be called for.

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## ANURIA DUE TO UNILATERAL CALCULOUS OBSTRUCTION.

FRANK (*Surgery, Gynecology and Obstetrics,* May, 1915) has observed five cases of total anuria in which the causative factor was calculous disease of one kidney only. He offers circulatory disturbance as an explanation of this in the presence of one obstructed and a second good and normal kidney. The most important feature in connection with these cases of anuria is the absolute absence of any disturbance in these individuals aside from lack of urinary secretion. Usually a history of previously existing calculous colic may be obtained, but this is not always the case. It must be borne in mind that obstruction due to calculus may occur in the very young. Morris quotes two cases of Rayer's, infants at the breast, aged two days and eight days, who died in convulsions as the result of small calculi.

Diagnosis may be corroborated by a thorough cystoscopic and radiographic examination. If such examination be negative, with a clear history and a fair presumption as to the cause of the obstruction, operative intervention is urgently and immediately indicated. If for any reason immediate surgical intervention is not undertaken and it is impossible to pass the obstructing stone, lavage of the unobstructed kidney through the catheter may be of some benefit in reëstablishing kidney secretion. Purgation and depletion for the purpose of lowering blood-pressure may be useful in attempting to restore the flow of urine. Digitalis with large amounts of water and other diuretics is to be deprecated and condemned, as this tends to raise blood-pressure and make bad matters worse.

The mortality for non-operative or expectant treatment is very high, ranging from 70 to 80 per cent, whereas in the cases which have been treated surgically the mortality is only half as great. Demon reports a case operated upon as late as the eleventh day, and Chevalier cites a case operated upon the fourteenth day, both with recovery. Russell reports a case living twenty-eight days with anuria, with recovery after relief of obstruction. The obstructed kidney must be either nephrotomized or pelviotomy should be done. The latter is to be preferred if it can be done quickly, as this releases the intrapelvic pressure. Decapsulation of the obstructed kidney is absolutely valueless, whilst decapsulation of the unobstructed kidney may restore secretion. It is by no means necessary to remove the calculus at the first operation, and time should not be wasted in attempts to do so or in a search for the stone. Surgical intervention should in no instance be delayed more than forty-eight hours, no matter what kind of treatment may have been instituted previously, and in some instances it should not be delayed so long.

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## EMPYEMA OF THE THORAX.

WILENSKY (*Surgery, Gynecology and Obstetrics,* June, 1915) records that in 75 per cent of the patients studied the cause for the formation of a chronic sinus was present from the very inception of the disease. Fifty-two per cent had uncollapsible cavities. Seven per cent had lung abscesses or bronchopulmonary fistulæ, or both of these together. Fifteen per cent were tubercular in origin. Excluding the tuberculous cases, which present a special problem—that of the cure of tuberculous infection—60 per cent of the patients owed their chronic sinuses to conditions which were present and were not remedied at the primary operation.

The method of operating for acute em-

pyema must permit of a thorough examination of conditions in the chest and the removal or correction of any lesion which tends to the formation of chronic sinuses.

The remaining 25 per cent of the patients owed their chronic sinuses to faults in the after-treatment, which with good care can and should be eliminated.

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## MILITARY SURGERY FROM THE VIEWPOINT OF A FIELD CONSULTANT.

MOYNIHAN'S views (*Surgery, Gynecology and Obstetrics,* June, 1915) are not only clear, but so vividly expressed that his every written word is worth while. He notes that almost invariably wounds which come from the front arrive at the base hospitals in a septic condition. The only wounds which are not infected are those resembling the wounds so frequently seen in the war in South Africa, namely, those which have been dealt by rifle bullets. These are occasionally, only very occasionally, seen now. The majority of wounds seen at Rouen are those inflicted by shrapnel, and these are without exception of a septic nature. The fault lies not with those in care of the wounded, but with the conditions under which these wounds are inflicted. Moynihan felt that since Lister had lived we should be able successfully to attack the wounds with the armamentarium at our disposal to-day; but he was soon bitterly disappointed. He found that the treatment of these wounds by the kind of technique used for the comparatively trivial septic wounds occurring in a civil population was utterly futile and without any value whatever. Since he came to France and saw the condition under which wounds were treated he had arrived at one fairly confident conclusion, and that is that any antiseptic, be it carbolic acid, iodine, or what not, is almost without any value whatever. He doubts whether it is of more value to use antiseptics than it is to use ordinary water; in fact, he believes that before the war is over we shall have changed entirely our method of attacking these wounds.

The wounds which do best are either those treated by constant irrigation, or, better still, by immersion. If it is impossible to immerse the wound in water, it can be immersed in air, the limb being laid quite bare. Among the most troublesome wounds are those involving the knee-joint. It is absolutely necessary to drain the average case thoroughly. It is almost the rarest exception to see a knee-joint infection attacked in the proper way. Knee-joints are frequently drained by a tube on one or two sides or across the joint. One must bear in mind that the knee-joint from the standpoint of the surgeon consists of three joints in one. It is absolutely impossible to drain a knee-joint from the front—it is difficult enough to drain it from the back. In draining the anteroposterior cavity of the joint it is necessary to have a tube incapable of compression, so that metal tubes are best. Use, therefore, metal tubes anteroposteriorly, putting five into the knee-joint, and then immerse the knee. To do this it may even be necessary to place the whole patient in a bath. It does not matter a bit what is put into the bath as long as it is water. It is obvious that an antiseptic of any strength cannot be used, since the patient is immersed up to his waist in the water. The change which comes over the knee-joint or wound of the leg as soon as drainage is established and constant immersion is started is really very dramatic.

The only dressing of any real value is the salt solution which Sir Almroth Wright introduced. Within a period of two or three days this produces the most profuse secretion or discharge of pus and the wound begins to look healthy. Therefore we should give up dressings. We should cover wounds with just a little lint or a little gauze and salt solution. The dressings are not dressings in the sense in which we have employed the word in civil practice, but are a means by which noxious discharges are gathered round the wound and their escape prevented.

In conclusion, Moynihan states that he has had about 1300 cases of frost-bite. These cases do not compare accurately with

the usual frost-bite. Frost-bite in the sense in which we use the term is produced not only by cold but by pressure and damp also. By the time the patient reaches the base hospital the need is not so much of prophylaxis, or treatment, but of comfort. As far as the local treatment is concerned, it does not matter what is done. One comes across turpentine and lanolin enthusiasts, and a variety of other measures are used, but as far as the process of healing in the limb is concerned nothing has much effect upon the rate of recovery. On the other hand, one notices a strong desire on the part of the limb to recover of itself. Above all, therefore, do not amputate on any account; let the patient discharge the bits of limb himself. The only thing to do is to make the patient as comfortable as possible. One is told that frost-bite is an exceedingly painful condition, and certain changes in the limb do indeed take place, but for the most part pain is due to the treatment which is adopted. Frost-bitten feet should not be kept warm; they should not be covered; or if covered, the covering should be as light as possible. Since they have left frost-bitten feet uncovered, they have not had to give the patients morphine. In the hospital patients are seen with their uncovered feet raised on two or three pillows. They may be quite bare or may have just a light covering, but coolness and comfort always go together.

As for scientific control of field service, Sir Almroth Wright in the same journal notes that, to begin with, quite wrong ideas were current as to the species of microbes which would be found in this war. They thought that they should have chiefly to deal with the staphylococcus and streptococcus, but an entirely different series of anaerobic microbes was found, of which Welch's bacillus was one of the most common. The streptococcus was of course frequently met and remained behind when the wound was thoroughly well opened and aerobic conditions were established. Then the picture presented was not a very formidable one; but there were also certain infections by the staphylococcus and streptococcus, as well as by the bacillus proteus, which were of a more serious nature.

In all cases the first attempt was to obtain prophylactic treatment by means of antiseptics. The wound was opened up and strong antiseptics were introduced in order to kill the microbes. This method has been pretty completely tested by means of iodine and carbolic solutions, etc., and it has been found that all of the microbes cannot be killed by these measures and that infection remains behind; in short, instead of a closed infected wound one has to deal with an open wound which is infected. He outlines the main features of the treatment of these open wounds.

First of all drainage is established. Drainage in a surgical sense means the making of an exit for pus and discharges, and stress has been laid upon the necessity of making an incision at the lowest possible place, so that gravity may carry away the discharges; but when an incision is made at the lowest point there is still not a sufficient exit. It is no more effective than the draining off of effluents from a hole made in the bottom of a cesspit, to which deep-wound incision may be compared. Wounds which are perfectly well drained may still go on discharging pus. Drainage, therefore, must be followed by lymph lavage, and no surgeon will be contented with his work if he does not follow out this practice. After opening wounds the practice is to put on fomentation; this makes active hyperemia and causes lymph to pass out of the wound, and thus we obtain lymph lavage. Bier suggested that in cases of carbuncles one should apply a negative pressure and draw out lymph by this means, but this has a negative result. A more reasonable method is to use a hypertonic solution, and Wright has suggested that a one-half-per-cent citrate of soda and a 5-per-cent salt solution should be used to call forth lymph.

Every wound after it had been surgically drained should be treated by lymph lavage, as this seems by far the most effective method of treating wounds. If a wound can be opened and drained quickly and

later lymph lavage is introduced, practically all that is possible has been done to bring about antibacterial activity. It may so happen that the particular patient under treatment has not enough antibacterial substances of his own. In such cases the use of vaccines is required, but they must be preceded by drainage and lymph lavage. In very favorable cases drainage and lymph lavage are in themselves sufficient to bring about clean healing, but even in such cases these means are even more efficacious when combined with vaccines. The prophylactic vaccine administered should be fortified against Welch's bacillus, and at a later stage the wound should be inoculated with a vaccine containing staphylococcus, streptococcus, and bacillus proteus. The best treatment of wounds then is by drainage and lymph lavage, the antibacterial power of which should be increased by the use of vaccines, especially if the power of resistance of the blood is not sufficient.

Speaking of the use of antiseptics, Wright says that it was surprising to learn how frequently it occurred that patients whose wounds had been treated with antiseptics made no progress for weeks or months. Certainly the value of antiseptics needs further investigation. Lister's successes resulted from the prevention of the introduction of microbes into wounds and of their transference from one patient to another. The third use of antiseptics, however, was their therapeutic employment in the wounds themselves. If you ask the doctor what is his object in washing out the wound with antiseptics, he will answer: "There are a lot of microbes, and I hope to diminish the number to a greater extent by washing out the wound with an antiseptic than I should by the use of water alone." In other words, he assumes that a smaller number of microbes are left behind in the wound by his antiseptic methods, and that this is greatly to the benefit of the patient. Now that does not accord with a good deal of bacteriological experience. It can readily be seen that after twenty-four hours no advantage would result from the diminution of microbes, a fact with which all surgical experience is in accordance, which shows that no striking benefits have resulted from the introduction of antiseptics into wounds.

What ought one to do with a wound? Anybody will say, "First establish permanent drainage, and then dress it every two to three hours." We know by experience that drainage is good, and that frequent dressing is good, but Wright gives the result of certain investigations bearing upon this point. They endeavored to find out what would happen if they took the discharges from the wound and isolated the pus for examination. For this purpose they made a "pus leech," extemporized very easily by means of a small test-tube to which a piece of rubber tubing had been attached. This apparatus can be made of any desired size and may be applied either to a surface treated with antiseptics or to a surface not so treated. One striking fact at once noticed was that even if the wound itself was purulent and contained a large number of microbes the fluid drawn up by the leech tube was perfectly clear and practically contained only the streptococci. Inside the tube was a clear fluid with white corpuscles, a fact which showed that the streptococcus can live and grow in the unaltered lymph and blood fluid of man.

The residual pus in the wound was really the enemy. If we add a trypsin to ordinary blood fluids they become good culture media.

Wright suggests the following explanation of these facts: When an inoculation of perfringens is made in the blood there is not one microbe which would produce septicemia. If a microbe is to grow in the blood it must find its food ready made; any antitryptic power in the blood stands in its way, but if this opposition is reduced by the introduction it is easy for the microbe to propagate itself.

Metchnikoff has said that immunity is a question of training the white blood-corpuscles, and that when properly trained they pick up microbes. He showed years ago that in an animal that is immune emigration occurs and an effectual phagocytosis is established. It is a matter of importance

to study this emigration quantitatively. This might be studied experimentally by taking any blood-clot and floating it in a fluid and then investigating it to discover what comes out of the clot. There may be difficulty in doing this for the reason that the clot consists of fibrin, and as a fibrin shrinks the fibrils may give way and thus hemorrhage from the blood-clot may occur.

Take the blood, put it into a tube, and centrifugalize it. Thus all the red blood-cells will be carried to the bottom of the tube, the other half being filled by fluid. Let that fluid portion clot, and a red and white worm will be left. By this method, a method of quantitative measurement, it was possible to find out whether any particular fluid will promote or retard or prevent the emigration of the white blood-corpuscles. Such a study shows that antiseptics interfere with rather than favor the natural immunity of injured tissue.

The most valuable treatment of wounds lies in the establishment of lymph lavage by the use of hypertonic solutions; by warm fomentations frequently changed; by continuous lavage or immersion; and by vaccination.

# CORRESPONDENCE.

## LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

This present month has brought forth very little news requiring comment. It can, however, be said quite definitely that London is very much more empty than usual as regards both people and traffic. The proportion of men met in the streets is very obviously less than formerly, and the great majority of such men as are seen are over the age for military service. Latterly, too, it is quite noticeable that the men in khaki are not so evident as formerly, this no doubt being due to the fact that they have been stationed at various places up and down the country or have been sent abroad. Women are taking the place of men, especially on the railways, where they are as efficient as the men. A number, too, are learning to drive motors, and already some are employed on the delivery vans of certain of the large shops, and do a full day's work in this respect. Others may be seen in the van with the driver taking the place of the delivery clerk. In spite of these facts there still seem to be a number of men of military age employed on cabs, trams, and busses, but it is quite possible that these men are for some reason not physically fit for military service.

There has not recently been a large influx of wounded, but the general policy of the War Office seems to be as before, to keep the large centers empty and to send the wounded as much as possible into outlying districts, leaving London and the more accessible towns empty in view of future emergencies. In respect of this plan the small hospital is proving itself extraordinarily useful. By the small hospital we mean those in country districts, either preëxisting cottage hospitals or private houses given over for this purpose. Of such there are over six hundred in this country, with an average of about thirty beds apiece. The nursing is supplied from the "Voluntary Aid Detachments" which were formed simultaneously with the reorganization of the Territorial Forces, and are entirely voluntary. The training of the personnel was carried out in peace time by the local practitioners, and examinations were held under the auspices of either the Red Cross or the War Office, certificates for proficiency being granted by these bodies. Early last autumn the detachments were taken over by the War Office and came directly under the control of the "Director-General of the Medical Services." It has been contended that such small hospitals are wasteful, but this is a very doubtful point. In some cases no charge is made at all for maintenance, nursing, or medical treatment in these hospitals, and such are a direct present to the nation.

Under other conditions a capitation fee of 2/- or 3/- per day, per bed occupied, is paid to these hospitals. Even where this payment is made nursing and medical attendance are given voluntarily. As regards the nursing, possibly it is not as good as it might be were only trained nurses employed, but according to accounts it is quite efficient. As regards the medical treatment, it may be pointed out that the doctors attending these hospitals are men who would otherwise not be capable of employment by the military, many of them being local practitioners. These hospitals are supplied with patients from the larger central hospitals of their own districts, and the selection is made so that cases are sent which are unlikely to require operative interference, other than in connection with minor wounds with which the local practitioner is quite capable of dealing. The moral effect of these hospitals is quite satisfactory. There is no doubt that the mental attitude of the men in the small hospital is better than that of those in the large hospital, for the soldiers seem to acquire an antipathy to hospital treatment and long residence in a ward very acutely and more rapidly than the average civilian patient. This antipathy seems to be directly proportionate to the number of men congregated in a ward. As these small hospitals are always constructed with a number of small wards, an aggregation of patients is obviated, and this is also true of the hospital established in the private house, where no more than five or six men will be in the same room. On the whole, therefore, these hospitals must be considered advantageous from every aspect.

As far as can be gathered most of the wounded from the Dardanelles, who can stand the journey, are being brought to this country as quickly as possible. At Harefield in Middlesex, about fifteen miles from London, the Australian Hospital has been established. This hospital is staffed by doctors and nurses from Australia and is remarkably efficient. The inmates are quite content and amuse themselves with such occupations as croquet and fishing. The fishing itself is not particularly good, seeing that the water is that of one of the main canals. It does, however, provide a certain amount of amusement, and the rod and float helps to pass the time though not demanding any great amount of skill. Croquet is especially recommended as a means of restoring suppleness to an injured limb.

Oxford has recently received a valuable gift of £25,000 from Mr. C. W. Dyson Perrins of Malvern. This sum is in addition to £5000 which he gave two years ago to assist the erection of a new chemical laboratory. The gift is said to be a direct answer to Mr. Pease (Minister of Education) in May last, who announced that it was the policy of the Board of Education to encourage and promote proper systems of research especially in our larger universities. Mr. Perrins's first gift, which was supplemented by a grant from the Endowment Fund in the hands of the Chancellor of the University, has been applied to the construction of a new chemical laboratory, which building is nearly completed, and is hoped will be opened in October. The additional sum of £25,000 will be employed to equip the laboratory and to form a permanent endowment fund in connection with this subject and the laboratory. This will now place the subject of chemistry, of which Mr. W. H. Perkin occupies the Waynflete Professorial Chair, in a very strong position. Oxford University has in the past twenty years made extraordinary progress in the teaching of science, being at first rather handicapped in comparison to Cambridge University by the want of proper laboratories and facilities for teaching these subjects.

The present state of war has brought the utility of medically qualified women to the fore. It is rumored that the number of entries at the London School of Medicine for Women attached to the Royal Free Hospital will be three or four times that of normal years. In order to accommodate the new students the Medical School will have to be enlarged. Appeals for money at the present time for purposes not directly connected with the war are not very successful. The present appeal on behalf of this medical school is very strongly sup-

ported by Mr. Asquith, Lord Curzon, and Mr. Balfour, and as the sum required, £15,000, is not a very large one, we trust it will be forthcoming. The Royal Free Hospital, to which the lady students proceed after having passed their preliminary subjects, is also to be enlarged, and may ultimately accommodate as many as six hundred beds. The need of more clinical material has been felt and complained of by some of the students at this hospital, and it is hoped that the extension will be completed within the next three years. If this object is attained the enlargement will have been made in due time to supply the needs of those who enter as students this year.

### POTASSIUM PERMANGANATE FOR MOSQUITO BITES.

To the Editor of the THERAPEUTIC GAZETTE.

SIR: Apropos of your abstract of Bryant's article on "Potassium Permanganate: Its Cooling Effect Upon the Skin," I desire to add that there is nothing in my experience more effective for mosquito bites than a strong solution of permanganate of potassium. I have found it equally useful whether the sting is produced by the dainty Jersey mosquito or the big fellows of the Montana Rockies. The solution must be strong enough to stain the skin dark-brown, and the resulting relief is instantaneous.

Truly yours,

NEW YORK. ABR. L. WOLBARST.

## NOTES AND QUERIES.

### THE LABORATORY AND THE BEDSIDE.

The *Boston Medical and Surgical Journal* of May 13, 1915, contains an editorial headed "The Heart Muscle in Pneumonia." It reads as follows:

"Preliminary announcement is made from the physiologic laboratory of the Harvard Medical School of an important piece of research on the heart muscle in pneumonia by Dr. L. H. Newburgh and Dr. W. T. Porter:

"When a cannula is tied into the descendens or the circumflex branch of the left coronary artery of the dog, and the part of the ventricle nourished by the artery is cut out, the piece of ventricle will beat for hours if supplied with warm defibrinated blood under moderate pressure.

"1. In our experiments the left ventricle from ten normal dogs, perfused with normal blood, contracted an average of 181 minutes. The area covered by the ten contraction curves (a measure of the work done by the ventricular segment) weighed 8.84 grammes, an average of 0.88 gramme.

"2. Exactly similar preparations from ten dogs that had died of pneumonia contracted an average of 200 minutes, and their contraction areas weighed 8.50 grammes, an average of 0.85 gramme. These ventricles were perfused with normal blood.

"It is evident that the heart muscle is not impaired in pneumonia.

"3. Similar preparations from ten normal dogs, in which the ventricular muscle was fed with blood from ten dogs near death from pneumonia, contracted an average of 70 minutes, and their contraction areas weighed 3.40 grammes, an average of 0.34 gramme.

"This demonstrates that pneumonia blood lowers the contractility of the heart muscle, though the ventricle is ready to beat normally as soon as its food becomes normal.

"4. Seven ventricles from dogs about to die from pneumonia were perfused with blood from the same pneumonic dogs. These ventricles beat an average of 185 minutes, and the contraction areas weighed an average of 0.69 gramme.

"This demonstrates that the heart in pneumonia largely adjusts itself to its poisoned food supply."